ROADS
STREE
HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION
Gillette Publishing Co., 22 West Maple St.
Chicago 10, Illinois

FEBRUARY 1956

UNIVERSITY MICROFILMS
313 N. 1ST ST.
ANN ARBOR, MICH.
EUGENE B. POWER
COMP-LRY-11-50

Georgia Granite "Hardest Yet"

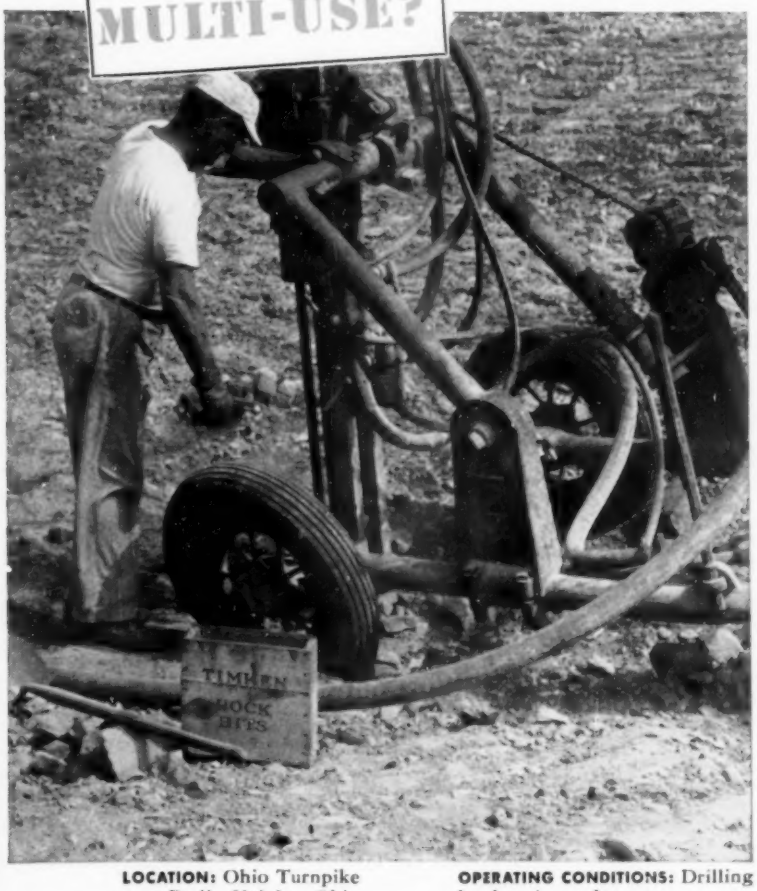
ARBA Holds Strong Meeting at Miami

Contents p. 4 — New Equipment p. 16

Accepted as Controlled Circulation Publication at Cedar Rapids, Iowa

CARBIDE INSERT? or MULTI-USE?

Switch to TIMKEN® multi-use bits helps lower cost of drilling sandstone on Ohio Turnpike for H. N. Rodgers & Sons Company



LOCATION: Ohio Turnpike near Berlin Heights, Ohio

OPERATING CONDITIONS: Drilling hard grain sandstone

WHEN H. N. Rodgers & Sons Company started drilling 230,000 yards of sandstone on the Ohio Turnpike near Berlin Heights, Ohio, they found their costs were running too high. After analyzing their technique, they made some changes. One was a switch to Timken® multi-use bits. Now costs are down. And Timken multi-use bits have been used ever since.

Timken multi-use bits usually give best results when you drill ordinary ground. With correct and controlled reconditioning, they give the lowest cost per foot of hole when full increments of steel can be used.

But they may not be the best answer for *all* your drilling problems!

When ground is hard or abrasive, Timken carbide insert bits drill faster and more economically. They're your best bit for constant-gauge holes, small diameter blast holes and extremely deep holes.

Timken multi-use and carbide insert bits also save time when your drillers change bits. They're interchangeable in the same thread series. And dozens of different Timken bits fit the same drill steel.

Both Timken multi-use and carbide insert bits are made from electric furnace Timken fine alloy steel. Both have special shoulder unions that protect threads from drilling impact.

To find out which type bit will cut costs most on your job, call on the Timken Rock Bit Engineering Service. Write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

your best bet for the best bit ... for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

high-powered pour...

PHOTO COURTESY BLAW-KNOX COMPANY, PITTSBURGH, PA.

Chrysler Ind. 30 Engine powers mixer, gýrol Fluid Coupling doubles its life

Going up . . . one apartment house, fourteen floors high, in Cleveland, Ohio. The transit mixer is a Blaw-Knox. It is powered with a Chrysler Ind. 30 – 230 cubic inch displacement engine.

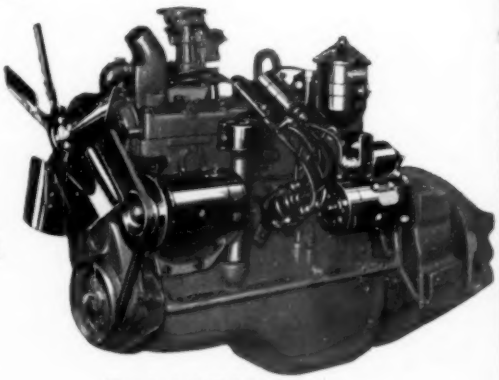
Most modern transit mixers are Chrysler-powered and equipped with Chrysler gýrol Fluid Coupling. And there is good reason for the popularity of this Chrysler combination.

In the first place, Chrysler Industrial Engines are heavy-duty, high-speed engines . . . constructed of heavy-duty components. Yet, thanks to Chrysler research in metallurgy, they are compact, lightweight engines, easily installed in modern equipment.

Secondly, gýrol Fluid Coupling – the other half of the Chrysler combination – absorbs the wear and tear imposed by power impulses, sudden starts and stops. The result is 100% *longer life for clutch, transmission and equipment itself.*

Finally, like other manufacturers of self-powered equipment, transit mixer manufacturers recognize the initial economy of installing Chrysler Industrial Engines. They know that Chrysler Industrial Engines are not expensive. Production-line methods adapted to specialized industrial engine building provide custom-built engines at mass-production prices.

Learn more about the advantages of Chrysler Industrial Power for your equipment. See a nearby Chrysler Industrial Engine Dealer or write direct: **Dept. 102, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.**



Chrysler Ind. 30 Engine — 230 cubic inch displacement

HORSEPOWER WITH A PEDIGREE

Chrysler

INDUSTRIAL ENGINES

Industrial Engine Division • Chrysler Corporation

. . . for more details circle 188, page 16

This cattle pass, on the Gales Creek Section of Oregon's new highway project, is one of many units fabricated of Beth-Cu-Loy galvanized steel culvert stock by Beall Pipe and Tank Corp., Portland.

What other culvert material matches these Beth-Cu-Loy advantages?

For culverts and other sub-drainage requirements, road builders have long recognized the value of copper-bearing, galvanized steel pipe. Beth-Cu-Loy galvanized-steel culvert stock, made of copper-bearing steel, easily meets the rigid standards of the AASHO and offers a combination of advantages hard to beat.

Drainage pipe made of Beth-Cu-Loy is strong, yet light enough to be handled easily in long lengths. It is durable enough to withstand the impact and vibration of modern traffic. Flexible enough to simplify alignment and grade maintenance. It stands up under the action of freezing and shifting soils, and reduces root hazard. The copper content gives proven corrosion-resistance to the basic steel, which is further protected by its 2-oz coating (triple spot test).

Bethlehem does not fabricate culvert pipe, but does produce Beth-Cu-Loy galvanized steel stock, in gages 8 through 16, for those who do fabricate it. For names of fabricators in your area, just drop a line to the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

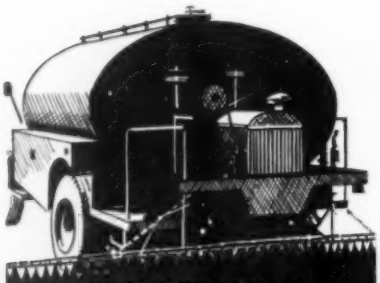
BETHLEHEM STEEL

BETHLEHEM STEEL

. . . for more details circle 180, page 16

INDULIN®

the stabilizer with advantages for



ASPHALT EMULSIONS

It has become evident over the years that asphalt emulsions for paving purposes must be stabilized, or they will break on contact with calcium-containing aggregates. The alkali lignins, of which INDULIN C is one, are proving most satisfactory of all materials tested as stabilizers.

INDULIN C meets many diverse requirements when incorporated into formulations at a low 0.6 to 1.5% of the total weight. It is physically and chemically compatible with all emulsifiers, particularly the rosin acid soaps most often used. It stabilizes asphalts from any petroleum source, works with aggregates from all parts of the country.

INDULIN C is stable to deterioration on storage or standing — and to temperature extremes. It will not lump under moist conditions. It has low ash content.

One good answer to emulsion stabilizing problems seems to be INDULIN C. Request Bulletin 101, and formulation assistance from our laboratory staff.

Polychemicals DIVISION

West Virginia Pulp and Paper Company

CHARLESTON 4, SOUTH CAROLINA

. . . for more details circle 247, page 16

ROADS AND STREETS

Sixty-Four Years of Editorial Leadership

Contents

FEBRUARY, 1956 • VOL. 99 • NO. 2

NATIONAL AFFAIRS

Washington News Letter 19
By Duane L. Cronk
ARBA Maps Long-Range Highway Job 71
Better Construction Planning Needed 76
By A. C. Clark

CONTRACTOR METHODS

Solid Granite — Toughest Yet 57
Dynamite Helps Salvage Old Truss Spans 66
Contractor's Eye View of the Urban Problem 78
Culvert Poured with Simple Portable Outfit 80

MAINTENANCE

Huge Snow Fence Footage Set by Hand 82

PLANNING AND ADMINISTRATION

Consultant's Role in Highway Work 84
By Duane L. Cronk

DRAINAGE PROBLEMS

Drilled Horizontal Drains for Landslide Control 87
By William L. Eager

MATERIALS AND TESTS

Use and Testing of Asphalt Coating Additives 127
By L. T. Crews and M. L. Kalinowski

PAVING AND SURFACING

What You Don't Know *Will* Hurt You 126
By H. G. Nevitt

DEPARTMENTS

Meetings Ahead 67
Editorials 68
Engineering Digest 98
By John C. Black
New Publications 101

WHERE TO BUY IT

What's New In Equipment and Materials 16, 106
Manufacturers' Literature 135
With the Manufacturers 141

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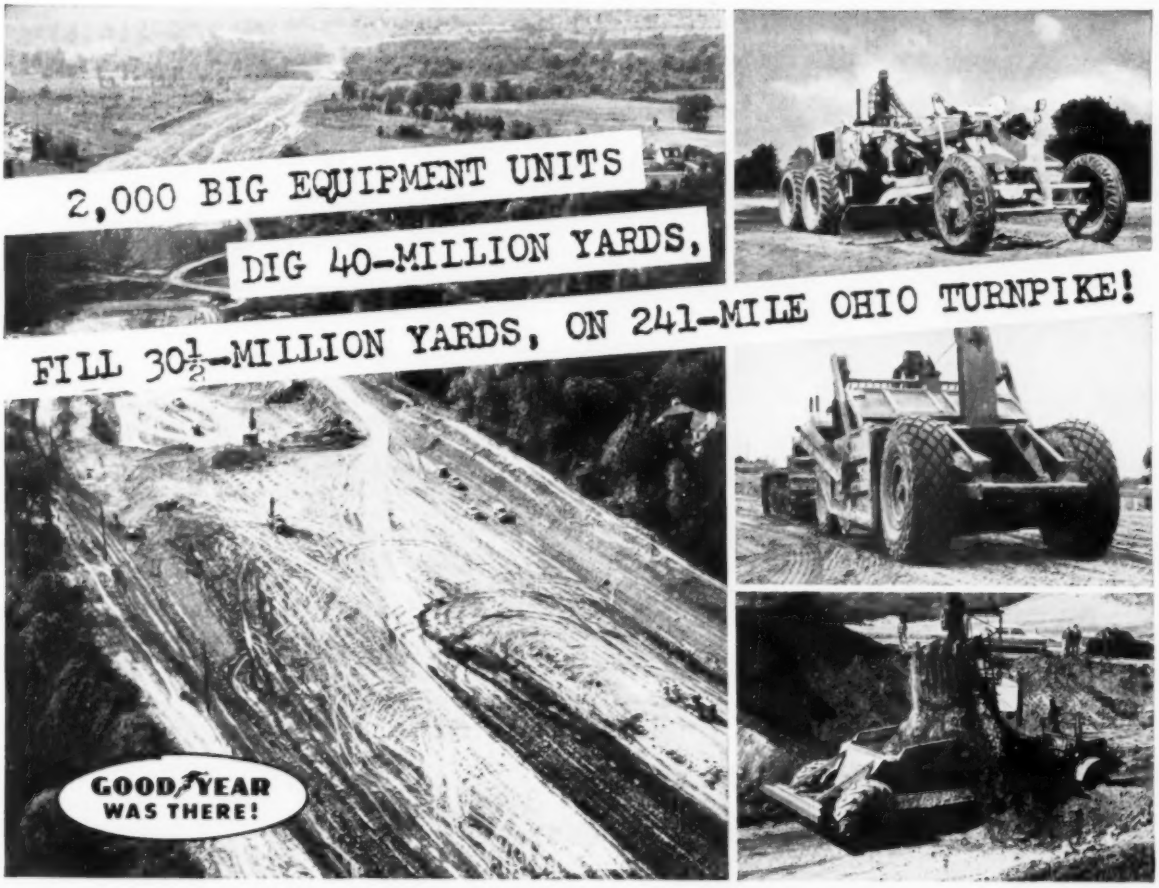
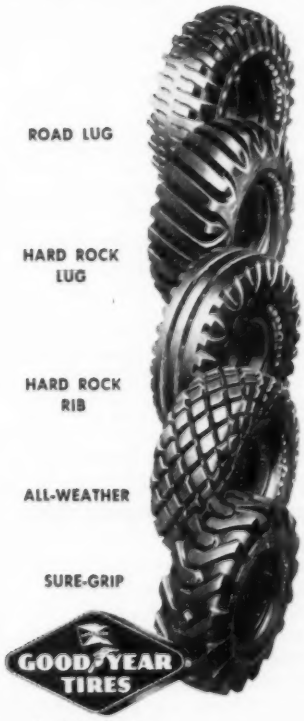


Humming to the tune of 39,000 vehicles a day, Ohio's new 241-mile toll road, of twin 24-foot pavements on 200 foot right of way, took less than 3 years from start to finish! This fast-stepping 20-hour-a-day pace was maintained by equipment drawn from all over the country—much of it rolling on Goodyear earth-mover and off-road tires built with 3-T NYLON Cord.



Look for this sign; there's a Goodyear dealer near you

YOU set the pace — TIRES OF 3-T NYLON CORD CAN TAKE IT!

Tires built with Goodyear's *exclusive*-process 3-T NYLON Cord have been on the toughest, fastest-moving jobs for almost 2 years. In that time, they've proved themselves *the greatest moneysavers for truckers and contractors in 20 years!* 3-T NYLON CORD keeps bruise breaks and heat blowouts close to the vanishing point, virtually eliminates ply separation and flex failure—keeps tires in shape for many more re-lugs and recaps. If you want to cut your tire-cost-per-job, specify Goodyear 3-T NYLON Cord tires—conventional or tubeless—for everything that rolls! Goodyear, Truck Tire Dept., Akron 16, Ohio.

FOR EACH JOB, THERE'S A COST-CUTTING GOODYEAR TIRE BUILT WITH 3-T NYLON CORD

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Road Lug, Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

. . . for more details circle 207, page 16

Sealing Compounds at Work!

sealing paving joints on

OHIO'S "MILLION-DOLLAR-A-MILE" TURNPIKE

with cold applied

PRESSTITE No. 77

All longitudinal and transverse joints in completed sections of the Ohio Turnpike have been sealed with Presstite No. 77. Selection of this cold applied rubber base sealer was based on successful experience of Ohio's Department of Highways, which has used No. 77 in large volume since 1951 with outstanding results.

Experience has proved that No. 77 remains flexible, resilient and adhesive longer, and forms an impervious barrier against passage of water through joints into the sub-grade better than any other type of joint sealer. It remains tough and elastic from sub-zero temperatures up to 140°.

Cold applied No. 77 is pumped direct from shipping drums into the joints under pressure through hose and nozzle, eliminating dangerous, time-consuming heating and equipment cleaning, cutting time and labor costs.

Solve your pavement sealing problems like many other states, cities and airports have done . . . Seal Right with Presstite!

FREE! *20-page catalog describing better sealing methods with cold applied Presstite No. 77.*

PRESSTITE SEALING COMPOUNDS

PRESSTITE ENGINEERING COMPANY

3782 Chouteau Avenue • St. Louis 10, Mo.

. . . for more details circle 235, page 16

ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 63 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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CATERPILLAR ANNOUNCES:

A NEW TRACTOR-MOUNTED RIPPER!

...TO SPEED UP SCRAPER LOADING
...KEEP EARTHMOVING COSTS DOWN

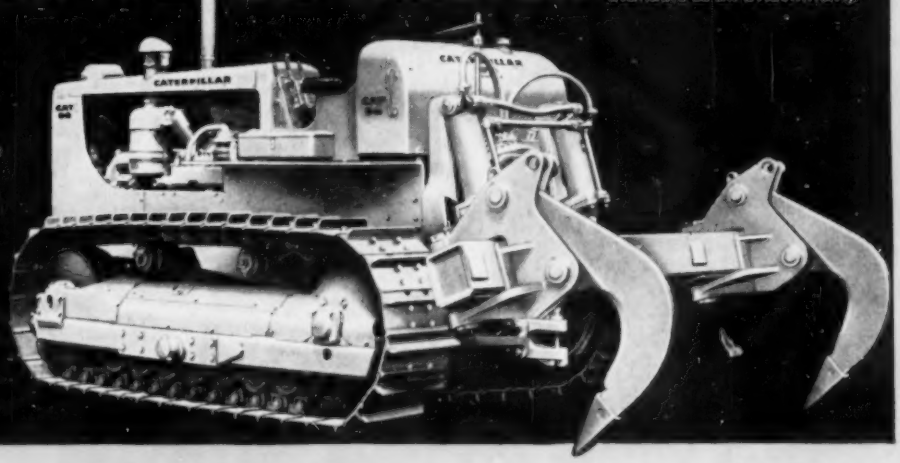
NO. 8 FOR THE D8 TRACTOR

TWO TEETH (center tooth available as an attachment)

NEW SPEED

NEW MANEUVERABILITY

NEW EFFICIENCY



WHY TRACTOR-MOUNTED. With the tractor-mounted CAT* No. 8 Ripper, full weight of rear of tractor provides down pressure. No weights or ballast needed. With ripper beam raised, tractor is fully maneuverable. At end of ripping job, unit is fully available for bulldozing —with ripper instantly ready when needed again. When ripper teeth are swung up, drawbar is available for use.

WHY "LIVE DRIVE." Pump providing hydraulic power for ripper is driven directly from engine rear power take-off. This means ripper can be raised or lowered whenever engine is running, independent of tractor motion or flywheel clutch. Raise, hold, lower and float positions controlled by touch of operator on conveniently located lever. Hydraulic cylinders have enough force to lift rear of tractor off ground.

FEATURES

- **Strong, curved shanks of hardened alloy steel.**
- **Hardened steel points, quickly replaceable.**
- **Whole assembly mounted on heavy box-section beam.**
- **10-degree pivot of shanks to either side allows easy tractor steering.**
- **Individual shanks can be pinned up out of way, for single tooth ripping.**
- **Finger-tip operation of controls, easy handling.**
- **Total weight, hydraulic control and ripper: 6680 lb.**

Your Caterpillar Dealer can show you how this new ripper can increase production and profit for you by cutting scraper loading time. When you standardize on Cat-built equipment, you standardize on competent dealer service and Caterpillar parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NEW HEAVY-DUTY TRACTOR-MOUNTED RIPPERS

CATERPILLAR TRACTOR CO., Peoria, Illinois, U. S. A.

Please send me full information about the No. 8 Ripper.

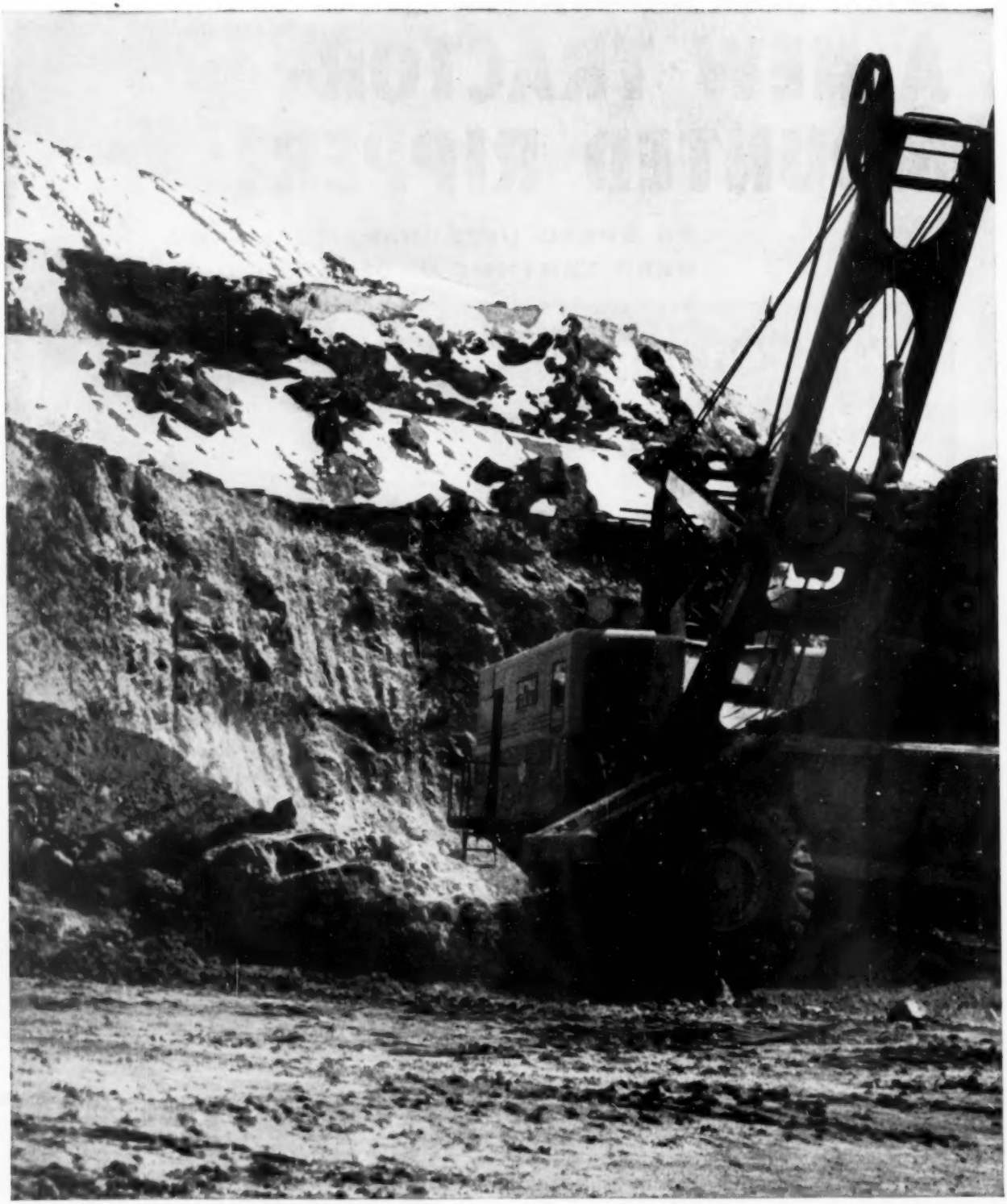
*Name*_____

*Company*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

. . . for more details circle 182, page 16



TUNE IN:
TEXACO STAR THEATER
starring
JIMMY DURANTE
on TV Saturday nights.
METROPOLITAN OPERA
radio broadcasts
Saturday afternoons.

TEXACO

TEXACO

When Marfak goes in . . . dirt stays out

TEXACO MARFAK keeps bearings clean, seals out dirt and dust. It won't jar or squeeze out, even under heavy shock loads. And *Texaco Marfak's* tough, moisture-proof film guards against wear and rust. All chassis parts last longer . . . you enjoy high operating efficiency and low maintenance costs.

In wheel bearings, use *Texaco Marfak Heavy Duty*. While sealing out dirt and moisture, it seals itself in. That means safer braking and protection that lasts for thousands of extra miles, with no seasonal change required.

If you want *just one lubricant* to handle all chassis, wheel bearing, water pump and other grease lubrication — *Texaco Marfak Heavy Duty Special 2* is the answer. This new, lithium-base member of the famous *Marfak* family pumps easily at low temperatures and lubricates effectively over a wide temperature range. It resists water washing, stands up under the most rugged service.

More than 600 million pounds of Texaco Marfak have been sold

For transmissions and differentials, *Texaco Universal Gear Lubricant EP* assures smooth, quiet gear operation — lower upkeep costs.

On crawler mechanisms, use *Texaco Track Roll Lubricant* — noted for its full protection against mud and moisture, its ability to prevent rust and reduce wear.

A Texaco Lubrication Engineer will gladly recommend the proper lubricants to help you increase efficiency and bring down costs throughout your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO SIMPLIFIED LUBRICATION PLAN: Saves you time, worry and money . . . reduces your lubricant inventory. With *no more than six* Texaco Lubricants, you can handle *all* major lubrication on any project. Ask your Texaco Lubrication Engineer for full particulars.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

. . . for more details circle 242, page 16

It's usable horsepower that counts!

Internationals give you power without strain at safe, economical rpm to save you the BIG money!

Rated horsepower figures don't tell the whole story of truck performance.

Wise truck buyers want to know *more* than rated horsepower. They want to know what actual *usable* horsepower they are going to get to pull capacity loads at normal, legal speeds—without undue engine strain.

Usable horsepower—that's the point to keep in mind when buying trucks.

INTERNATIONAL engines deliver high usable horsepower at economical, wear-reducing speeds. Because they are built for use in *trucks*, with no compromise with passenger car design.

You get the usable power you need, plus longest truck life, every driver comfort and convenience. See your INTERNATIONAL Dealer or Branch for trucks exactly right for your job—all-truck built to save you the BIG money.

INTERNATIONAL HARVESTER COMPANY · CHICAGO

Many passenger car type truck engines have to rev up to high speeds to pull their loads. They strain at the job—cost big money in wear and repair. INTERNATIONAL all-truck engines turn at relatively low rpm—deliver high usable horsepower at normal road speeds, for peak performance, long life, BIG money savings.

In the world's most complete truck line, there are trucks for every job. More than 200 basic models from 4,200 to 90,000 lbs. GVW—conventional and COE, 4-wheel, 6-wheel, four-wheel-drive—in thousands of variations for exact job specialization.

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

Motor Trucks • Crawler Tractors • Industrial Power
® McCormick® Farm Equipment and Farmall® Tractors

. . . for more details circle 218, page 16

200 to 400
TONS PER HOUR!

when it gives
Production like this—

IT'S A CEDARAPIDS COMMANDER

Wherever you see a portable aggregate plant producing 200, 300 or 400 tons per hour, day after day and month after month, with low, low operating costs — chances are it's a Cedarapids Commander!

The plant shown below, owned by P. O. Pederson of North Branch, Minnesota, is turning pit run gravel (with crushing 15% and up) into ¾" and 1" aggregate at a rate of 200 to 300 tons per hour. Other producers report as high as 400 tons per hour production!

The big, *balanced* production of crushers, horizontal screen and conveyors is the secret of the Commander's high tonnage output. Cedarapids-Quality construction is the secret of low maintenance and operating costs.

There's sure to be a Commander working near you. Watch it produce — ask the owner for his opinion — then call your Cedarapids distributor for additional information.

Cedarapids
Built by IOWA

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

. . . for more details circle 220, page 16

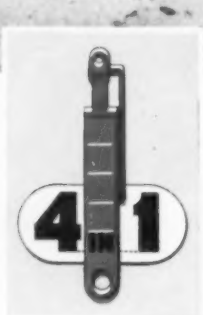
IT'S A Skid-Shovel

with Drott's exclusive *triple-power*, pry-over-shoe break-out action—plus 42° ground-level bucket roll-back! The Skid-Shovel position also gives you speedy straight-forward loading—time-gaining, strain-saving Skid-Shoe load transport!

EXCLUSIVE NEW 2¼-YARD *gives you 4-machine utility ...*

IT'S A Clamshell

a "wide-opener" that gives you a speedy bucket-fill on stockpiled loose materials, even in cramped quarters. And as a clamshell, the Four-In-One gives you a 30-inch dumping height advantage over ordinary roll-forward bucket dumping.



Move the Four-In-One "machine-selector" lever with finger-tip ease, and prove *versatility unlimited* . . . get the job-range of a machinery yard full of costly, limited-duty rigs! Test the tremendous excavating power of exclusive pry-over-skid-shoe break-out action. Compare how exclusive shock-swallowing Hydro-Spring speeds production, protects performance. Try this big new 2¼-yard Four-In-One, or the TD-6 one-yard or TD-9 1½-yard model. Ask your nearby International Drott distributor for a demonstration!

IT'S A **Bullclam**

with famous Drott Bullclam Shovel efficiency on all Sanitary Landfill operations—*plus* unequalled ability to *strip, grade,* and *spread,* using clam lip control. And as a Bullclam, the Four-In-One can *self-load* like a carry-type scraper!

TD-14 FOUR-IN-ONE

for one moderate investment!

IT'S A **Bulldozer**

with clam open in bulldozing position, the big-capacity earth-rolling blade has cutting edge and shoes on the ground. You regulate depth of cut with ease and accuracy by hydraulic "radius control" of blade pitch (forward and backward).

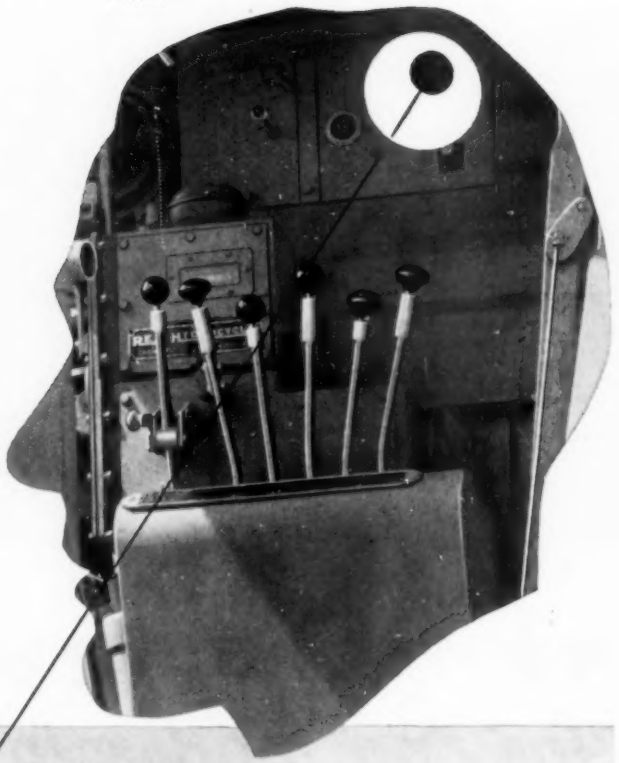
International Harvester Company, Chicago 1, Illinois

INTERNATIONAL®

DROTT

. . . for more details circle 219, page 16

Why you're always "yards" ahead with a REX® Paver



You'll finish "yards" ahead every day with a Rex... because the "hydraulic brain"—Hydrocycle Control—helps you pour more yards—faster! Hydrocycle saves you seconds every batch...you place more batches every day. That's dollars saved every day!

Hydrocycle takes over once the operator sets the batch meter...controls and operates the entire cycle. It eliminates the human element...cuts operator fatigue. There's no guesswork...no wasted seconds. The operator never has to leave his seat. He stays fresher...more relaxed...is able to give you the same high-speed operation at the end as well as at the start of the day. And he has far more time to perform the other paver functions—travel the bucket, swing the boom, spread the batch and move the paver. It's the big reason why Rex is the fastest paver in the business...makes more profit for you every day!

For all the facts, see your Rex Distributor or write CHAIN Belt Company, 4652 W. Greenfield Avenue, Milwaukee 1, Wis.

CHAIN BELT COMPANY

. . . for more details circle 187, page 16

IMAGINE

NO CENTER PIN OR NUT
NO TURNTABLE ROLLERS
NO ADJUSTMENTS

WITH LORAIN'S NEW REVOLUTIONARY "SHEAR-BALL MOUNTING"

THE GREATEST SHOVEL-CRANE DEVELOPMENT IN YEARS

With this revolutionary type of shovel-crane mounting, the Turntable revolves on a full circle of over 60 hardened steel balls snugly sealed in hardened steel races. In this design, the outer race is attached to the mounting, the inner race is attached to the Turntable . . . and the design is such that the balls themselves interlock the two races and thus hold the Turntable on the mounting. As a result, the balls take all vertical, horizontal and radial loads and thrusts; consequently, there is no need for a center pin and center pin nut, no need for a centering gudgeon and bushing, no need for Turntable top rollers or hook rollers, no need for an exposed roller path. And, thus, all the constant adjustments and other nuisances of these items are also banished forever for shovel-crane users.

At present, this new development in shovel-crane mountings is standard on 30-ton rubber-tire Lorains; is available as optional equipment on (1) 20- and 25-ton crawler machines and (2) 25-ton rubber-tire Lorains, in which case it permits greater lifting capacities when working on outriggers. Be sure to get all of the money-making facts about the new "Shear Ball Mounting" from your Thew-Lorain Distributor!

THEW LORAIN®

THE THEW SHOVEL CO., LORAIN, OHIO, U.S.A.

. . . for more details circle 243, page 16

WHAT'S NEW in Equipment and Materials

Hydra-Hammer Has All Weather Cab

The Hydra-Hammer of Ottawa Steel Division, L. A. Young Spring & Wire Corp., Ottawa, Kan., is now being offered with an all-weather cab, making it a year-around machine. The all steel cab has solid steel roof, and is made of 14 gauge reinforced steel throughout. All-around windows give complete 360 degree vision. Safety plate glass windows are rubber sealed. The sliding rear window gives ample ventilation. The cab is 5 ft. 2 in. high, 4 ft. long, 3 ft. 1 in. wide, yet inexpensive. It can be set up quickly with no special skilled workers required. It fits all models of Ottawa Hydra-Hammer, and is available for machines already in the field, as well as for new models from the factory.

For more information circle 101 on Service Coupon this page and mail now.

Light Weight Portable Safety Barrier

A new light weight portable safety barrier, announced by Monarch Road Machinery Co., 1331 Michigan St., N. E., Grand Rapids, Mich., can be erected in less than 20 seconds. It can be extended to just the right length needed up to 8 ft. Measuring only 8¾ in. x 36 in. when folded the unit weighs a little more than 15 lb. and can be easily carried on the back shelf or in the trunk of a car. With no parts to assemble, screw or fit together, it is always ready to give protection. The unit is built to really take it and is painted in yellow and black hard wearing lacquer. With it on the job there is no time wasted and no need to haul in heavy barricade lumber.

For more information circle 102 on Service Coupon this page and mail now.

Rotary Rock Drilling Rig

A new, low cost rig for rotary rock drilling with compressed air, the Rotadrill on Pneumatractor, has been developed by Schramm, Inc., 900 East Virginia Ave., West Chester, Pa. The rig is a complete, self-contained unit, self-propelled and self-powered. It is stated to be able to drill a 4¼-in. hole to a depth of 500 ft. One man operation is possible because all controls are arranged in one bank, adjacent to the mast. Special weight boxes and dual rear-wheels on a 125 cfm heavy pneumatractor provides 10,000 lb. down pressure. Normal compressed air drilling pressures of 20-30 psi can be instantly increased for dewatering or breaking out blockages. Standard rotative head has 75 rpm output and can be throttled down to complete stall while maintaining constant torque. Heavy welded structural steel mast, lowered for traveling between jobs, can be operated at various angles for sloping holes.

For more information circle 103 on Service Coupon this page and mail now.

Concrete Cutting Blades

A new concrete sawing blade, the Clyde "Duo-Bond," developed by The Clyde Co., 205 Sixth St., Racine, Wis., is claimed to substantially reduce concrete cutting costs, especially for contraction joint sawing in new concrete. It is also stated that cutting speed of this new blade is nearly double the speed normally obtained heretofore.

Secret of the new blade is in an entirely new diamond bond which is fortified through an exclusive process to provide an extremely tough cutting edge which greatly resists abrasion and wear, substantially prolonging blade life and thus reducing costs.

The blades are available in two distinct different types. For use in repair and maintenance work, Clyde features a thin especially fast-cutting blade for old

More equipment news page 106

hard concrete. For sawing joints in green concrete, Clyde blades are of greater width, so designed to provide a sufficiently wide cut for easiest application of all joint sealing materials. The Clyde Co. offers their complete line of blades in 12 in. and 14 in. diameters to fit any make of concrete sawing machine.

For more information circle 104 on Service Coupon this page and mail now.

Spark Resistant Digging Tools

A new line of paving breakers, demolition and digging tools, announced by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. are for application in any plant handling such hazardous liquids as gasoline, naptha, benzine, lacquers, etc. or flammable gases or dusts which could be ignited by a spark. These tools are forged from a beryllium copper alloy, a material long known for its spark resisting properties, and used for years in cast tools for safety purposes. The manufacturer claims tool life many times that of their cast counterpart.

For more information circle 105 on Service Coupon this page and mail now.

100-Ton Hydraulic Puller

A 100-ton hydraulic industrial puller has been developed by Owatonna Tool Co., 435 No. Cedar St., Owatonna, Minn. Powered by OTC's new 100-ton Power-Twin hydraulic ram, this triple grip puller is designed to handle those big tough pulling jobs on large diameter wheels, sheaves, sprockets, and gears in industrial and utility plants as well as heavy equipment maintenance shops.

For more items . . . see page 106

MAIL THIS COUPON TODAY!

ROADS & STREETS
22 West Maple Street
Chicago 10, Illinois

CIRCLE THE NUMBERS AND MAIL NOW!

Please send me further information on products and materials mentioned in the February Roads & Streets as circled below

About New Equipment and Literature:								101	102	103	104	105	106
107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134
135	136	137	138	139	140	141	142	143	144	145	146	147	148
149	150	151	152	153	154	155	156	157	158	159	160	161	162
163	164	165	166	167	168	169	170	171	172	173	174	175	176
Further Information on Advertised Products:								177	178	179	180	181	182
183	184	185	186	187	188	189	190	191	192	193	194	195	196
197	198	199	200	201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220	221	222	223	224
225	226	227	228	229	230	231	232	233	234	235	236	237	238
239	240	241	242	243	244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261	262	263	264	265	266
267	268	269	270	271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290				

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NOT GOOD AFTER MARCH 15, 1956

A READER SERVICE FOR YOUR NEEDS

NEWEST PAYLOADER® MODEL sets the pace for a bomber base

Here is the starting point of Peter Kiewit Sons "production line" for concrete placing at a large bomber base — a Hough model HH "PAYLOADER" tractor-shovel feeding a belt conveyor with sand and gravel from adjoining stockpiles. The task of the "PAYLOADER" is a crucial one, because failure at this point would bring the entire concrete-placing operation to a standstill.

Peter Kiewit Sons, one of the largest and most progressive of heavy contractors, have been using "PAYLOADER" tractor-shovels for years on their contracts all over the United States. You too, can depend on the proven performance of "PAYLOADER" tractor-shovels and on the large and reliable Distributor organization that sells and services them, both at home and abroad.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

This model HH is one of three completely-new 4-wheel-drive "PAYLOADER" tractor-shovels. They all have a sensational new kind of bucket arm design that provides 40 degrees of bucket tip-back at ground level, powerful pry-out action plus unusual safety, stability and visibility factors.

THE FRANK G. HOUGH CO.
768 Sunnyside Ave., Libertyville, Ill.

Send data on new 4-wheel drive units

- ☐ Model HU—1 cu. yd.
- ☐ Model HH—1½ cu. yd.
- ☐ Model HO—2 cu. yd.

☐ Smaller "PAYLOADER" units

Name_____
Title_____
Company_____
Street_____
City_____
State_____

. . . for more details circle 215, page 16

TWO NEW POWERFUL HUBER-WARCO MOTOR GRADERS

7D 140 H. P.
28,500 lbs.
6D 100 H. P.
25,000 lbs.

Torque Converter and Power-Shift Transmission

Designed to Give the Power and Weight You Want in a Motor Grader

- Powered by GM 3-71 and GM 4-71 diesel engines.
- Tail Shaft Governor—automatically adjusts RPM to meet load conditions.
- Foot Clutch has been eliminated.
- Perfect balance of power and weight.
- Power Sliding Moldboard is standard equipment.
- Hydraulically Cab-Controlled Blade Movement—90° either side.
- Four Wheel Brakes—standard on 7D.

For a demonstration — see your nearest Huber-Warco Distributor

HUBER W WARCO

HUBER-WARCO COMPANY
MARION, OHIO, U. S. A.
Road Machinery
CABLE ADDRESS: HUBARCO

ROAD ROLLERS • MOTOR GRADERS • MAINTAINERS • GRINDERS

. . . for more details circle 216, page 16

ROADS AND STREETS
Sixty-Three Years of Editorial Leadership

Washington News Letter

By Duane L. Cronk

February 10, 1956

The uncertainty about what new proposals would be made to launch a national road building program slipped away last month as a number of Congressmen came back to work with bills in their briefcases.

Big news was the President's decision on January 31, to join forces with the Democrats on the bill drafted by Congressman George H. Fallon, chairman of the House Subcommittee on Roads. The Fallon bill, introduced by committee majority leader has been cleared through the Democratic leadership and represents the highway legislation strategy of the Party. Also in its favor, it contains no controversial taxing provisions, but leaves the knotty problem to the proper committee on Ways and Means.

(Republican support is now assured for increased highway user taxes to get the national highway program underway this session. Congressional leaders on both sides of the aisle apparently are agreed on this point. But the Democrats want assurance from President Eisenhower himself that the Republicans will support tax increases.

If this move for bi-partisanship is successful, observers say, prospects for the Fallon program are immeasurably better.)

* * *

Congressman Fallon's bill would authorize Uncle Sam to contribute $34.8 billion throughout the next 13 years for highway construction. Of this, $24.8 billion would be for building of the National Interstate System and $10 billion for the regular federal-aid systems.

Funds for the regular federal-aid systems would start at $725 million in fiscal 1957. (They are set at $700 million currently), and be increased by $25 million each year to $1 billion annually after 1968. Funds for the Interstate System would start with $1.2 billion in '57 and increase to a peak of $2.3 in '64.

* * *

Meanwhile, support is coming in for highway user tax increases:

● The Committee for Economic Development, reflecting thinking of many prominent businessmen, has urged that highway users pay via a federal gas tax increase of one-cent over a 20-year period. The committee asks that federal aid to the regular federal-aid systems not be increased but that the U.S. bear 80% of the cost of the Interstate System.

(continued on next page)

● The AAA, representing 5 million motorists, has proposed a 15-year financing program, based on a ½¢ gasoline tax increase, a 2¢ increase in diesel fuel and taxes on tires graduated upwards for trucks. Under the AAA plan, the federal government would contribute nearly $8.9 billion in aid during the first 5 years, of which $5 billion would be for the Interstate System.

● Congressman Dempsey of New Mexico has advised boosting the gasoline tax 1¢, the tire rubber tax 3½¢ per pound (regardless of size), and the excise tax on trucks and buses from 8% to 10%. (The truckers have agreed not to buck such across-the-board proposals.)

* * *

Disappointing to many was the inclusion in the Fallon bill of three highly controversial provisions which would (1) reimburse the states for funds invested in toll roads (past and future) and other projects designed to Interstate System standards, (2) reimburse utilities for relocation of facilities due to road work, and (3) establish truck size and weight limitations on the Interstate System.

Labor leaders are confident that federal labor laws will be extended to federal-aid highway construction, another aspect that bothers contractors and state highway officials, in the South particularly.

The big debate likely will be over the National Interstate System. While Congressmen seem willing to vote increased assistance for the established federal-aid systems, the NIS poses touchy political problems. For some, the $27-billion job is too grand a scheme to envision. Many are suspicious, opposed, or eager to escape a stand. Two serious political arguments are building up against the System:

● First is an attack on the suggested apportioning of funds to the states on the basis of need. State highway officials believe this basis would assure sound planning. It may be a businesslike arrangement, but Congressmen from states with little Interstate System mileage wouldn't gain much to take home for campaign purposes.

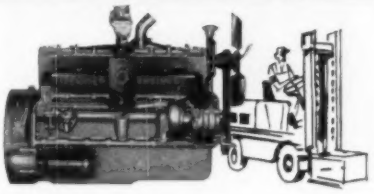
* * *

Many are aware, too, that the estimate of need, compiled last year by the BPR, and which would be the basis for apportionment, hasweak spots. A number of state highway officials are declaring that they grossly under-estimated their needs. Sounder estimates may be established, but Congressmen will be most reluctant now to authorize billions of dollars for apportionment on the uncertain existing-needs basis or an undetermined future scheme.

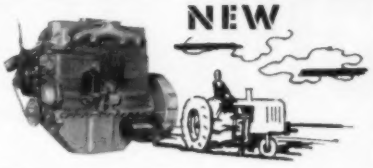
● Second issue coming into focus is the insistence of highway leaders upon high standards for the System, including control of access and by-passing of small towns. If 85% of the network is constructed on new location, as has been estimated, thousands of small enterprises might be temporarily disabled, some even put out of business. Congressmen are warning that highway designers must come up with provision for competitive merchandising areas near the routes.

The financing obstacle is still paramount, however, and if that can be solved, so can almost anything else. The signs are, once again, hopeful.

NOW . . . all types of engines from one dependable source

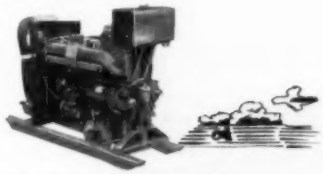


L-HEAD GASOLINE — Compact and especially adaptable for installations where space is limited.

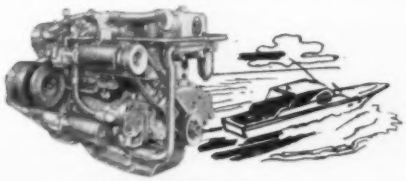


NEW

DD-SERIES — Direct injection Diesel. 12 models INTERCHANGEABLE with GO-Series gasoline engines.



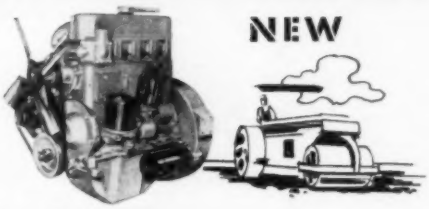
L.P.G. NATURAL GAS or KEROSENE engines are available in 40 models also popular sizes for irrigation service.



MARINE DIESEL ENGINES — Sizes from 75 to 500 H.P. for workboats and pleasure craft.

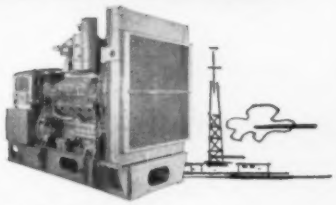
PRODUCTS OF

HERCULES engine manufacturing specialists

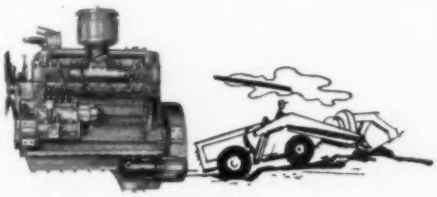


NEW

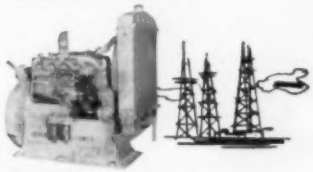
GO-SERIES — Gasoline Overhead valve engines. Available in 12 models.



SUPERCHARGED DIESELS — Maximum power for special installations such as micro-wave generator sets for coast-to-coast T.V.



TURBULENCE CHAMBER DIESELS — 32 models to 500 H.P. in 1, 2, 4, 6 and 8 cylinders.



POWER UNITS — Open, closed or base type units are available in most models of gasoline and diesel engines.

NOW . . . with the addition of the G O series (Gasoline Overhead valve) and the D D series (Direct injection Diesels), Hercules Motors Corporation offers a most extensive line of piston type engine to meet the varied needs of modern industry.

In addition to the many types of engines illustrated above, it is the policy of Hercules Motors Corporation to tailor engines to the special requirements of their manufacturing customers. Special versions of regular models — for example, "pancake" or flat engines — are often produced for particular applications.

Whatever your power requirements may be, HERCULES — Engine Manufacturing Specialists Since 1915 — will be happy to work with you and solve your power problems. For more information on the new G O and D D series — or any type of Hercules Engine from 3 to 500 H.P. contact the factory.

HERCULES MOTORS CORPORATION

CANTON 2, OHIO

. . . for more details circle 209, page 16

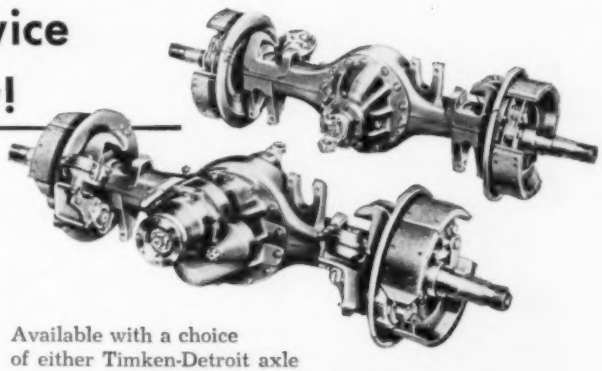
New TDA® lightweight

7,500 EXTRA TON-MILES

highway tandem gives

PAYLOAD A YEAR*

...built almost entirely from interchangeable standard axle parts for easier service and lower parts inventory!



This new lightweight tandem brings two important new advantages to construction truckers – greater payload capacity† and much easier maintenance.

More than two hundred pounds lighter than any other unit of the same capacity, this new TDA tandem will save a trucker 7,500 deadweight ton-miles during an average 75,000 mile year. This means more payload and profit where it counts.

Almost all of the parts – gears, pinions, differentials and brakes – used in this new tandem are interchangeable with parts from Timken-Detroit® standard single axles. This assures operators less down time . . . faster, simpler, more economical service . . . and smaller replacement parts inventory.

Available with a choice of either Timken-Detroit axle connecting groups, or brackets to accept other approved chassis hook-up parts. Plus these additional advantages with the Timken® lightweight tandem:

TDA Inter-Axle Differential Divides Torque Evenly Between Axles . . . and yet permits wheels of one axle to revolve faster or slower than wheels of the other axle. This means both axles are always doing equal amounts of work . . . driving parts and tires last longer.

Driver-Controlled Lockout – with TDA inter-axle differential, the driver can obtain the advantages of straight-through drive under slick or icy conditions by locking out the differential at *any* driving speed.

Big, Dependable Hypoid Gears rotate in conventional direction for maximum gear and bearing life.

This new highway tandem insures new payload profits, faster, easier service and operating economies for construction truckers everywhere. For complete information contact your nearest vehicle dealer or branch.

*based on 75,000 highway miles a year.
†for the same gross vehicle weight.

TIMKEN Detroit AXLES
TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN
The Accepted DTA Standard
TRADE MARK REGISTERED

World's Largest Manufacturer of Axles for Trucks, Buses and Trailers

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

©1956, R S & A Company

WEIGHT OF TYPICAL BATCH:

Portland cement . . 631 lbs.
Natural cement . . . 143 lbs.
Sand . . . . . 1222 lbs.
1-inch stone . . . . 1446 lbs.
2½-inch stone . . 1767 lbs.

145 BATCHES AN HOUR *speed*

Paving contractor on a large air base in one of the central U. S. states needed a fast, dependable batch plant that would turn out approximately 130 batches an hour. To meet production requirements, a fully-automatic Johnson one-stop plant was installed on a rail siding, a short haul from the immediate paving area.

Supplied by rail, truck

Bulk cement, delivered by rail car, was stored at the plant in three Johnson 825-barrel silos. Sand and stone, delivered by truck and rail, were fed into three Johnson auxiliary storage bins by a traveling stacker. From there, aggregates were fed to the batch plant by inclined conveyor.

Kept two 34-E pavers busy

With this efficient material handling system, the 5-compartment bin on top of the batch plant was stocked continually. The plant accurately weighed out aggregates and cement ahead of heaviest schedules — kept two 34-E pavers busy full time pouring 12-inch slab. While the plant's top-speed potential of 180 batches an hour could not be fully utilized due to normal job delays, this *reserve production capacity* easily assured an average of 130 batches an hour. In fact, during one 11½-hour period of peak operation, it weighed out a total of 1669 batches. That's an average of better than 145 batches an hour.

Actual pour for the 11½-hour day was 2300 cubic yards of concrete — or 200 cubic yards an hour. Each batch weighed 1.38 cubic yards, and consisted of five materials — sand, two sizes of aggregates, and two types of cement.

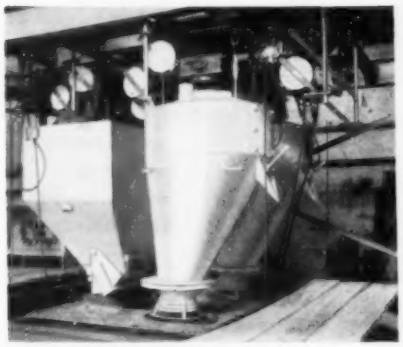
20 second batch-time

On this one-stop operation, average batcher fill-time was 10 seconds — discharge time, 10 seconds. Automatic control maintained high output, and assured pin-point weighing accuracy of every batch. A separate fully-automatic batcher was used for each of the aggregates and cement — all weighing up at the same time. These single-material Johnson batchers operate on electro-pneumatic control. Fill valves and discharge gates are automatic air-ram operated.

Johnson batch plants also can be arranged for two- or three-stop charging. Investigate the possibilities of increasing concrete production on your highway and airport paving. Get the complete story on Johnson automatic batch plants with multiple arrangements of single-material batchers, and one-man push-button control. All sizes, all types. See your Johnson distributor, or write us for latest batch plant catalog.

JOHNSON *automatic* BATCH PLANTS

paving job



Multiple batch selections

In Johnson single-material plants for roadbuilders' use, dial scale with electric cut-off switch is usually used. When more than one type of batch is required, Johnson single-material batchers can be equipped with mix selector and recorder for 12 different batches — all controlled from central operator's position. (Each aggregate batcher can be equipped with moisture compensator which automatically gives dry weight.) Up to 120 batch selections are available on Johnson automatic concrete plants for dams and commercial ready-mix installations.

C. S. JOHNSON COMPANY
CHAMPAIGN, ILL. *(Koehring Subsidiary)*

. . . for more details circle 223, page 16

Truck-loading with 16-S concrete mixer

Producing concrete for curbs and gutters, Kwik-Mix 16-S loads batch into trucks from ground-level. Tower loader gives 9 ft.-2 in. discharge height. Bucket holds full batch, is powered by mixer engine, dumps automatically at top of tower. Also available on 11-S Dandie®, and Kwik-Mix bituminous mixers for stockpiling and loading into trucks, overhead hoppers and forms. Ask Kwik-Mix distributor for more information, or write us.

KWIK-MIX• Port Washington, Wis.
(Koehring Subsidiary)

Puts trenching on fast "work-and-run" basis

Next job is only minutes away with this rubber-tired Trenchmobile®. It runs from job-to-job over city streets, highways or cross-country at 12.6 m.p.h. Works fast, too. Digs up to 14½ feet per minute, 8 to 16 inches wide, 5 feet deep. Sloping ladder boom undercuts walks, curbs, gutters, makes vertical set-ins. Hydraulic-control backfill blade optional. Also check big Parsons line of crawler-mounted wheel-type and ladder-type Trenchliners®.

PARSONS • Newton, Iowa
(Koehring Subsidiary)

No room to turn here— and no need to turn

Shuttling back and forth on overhead trestles, in tunnels, on narrow haul roads, Koehring 6-yard Dumptor® travels round trip without turning. It has the same speeds forward and reverse — operates with equal ease in either direction. Every turn eliminated saves 15 seconds, cuts cycle-time. You'll also like its one-second gravity-dump (no body-hoist), 24% gradeability, and other heavy-duty advantages for off-road haul.

KOEHRING Company
Milwaukee 16, Wisconsin
V6S

New SEAMAN-GUNNISON DUO-PACTOR Handles Both

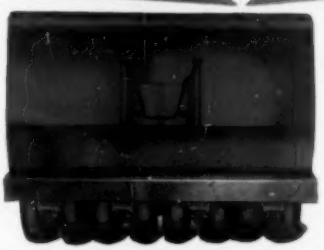
SEAMAN
...an old name in the soil stabilization field introduces:
A new company
Seaman-Gunnison Corporation
A new product
Seaman-Gunnison Duo-Pactor

Now, two compaction methods in one machine . . . an advantage found *only* in the Seaman-Gunnison Duo-Pactor. Unit offers pneumatic compaction through eight oscillating, spring-mounted wheels and rigid roll compaction to "iron out" the ridges left by rubber-tired rolling. Operator uses either of the two rollers independently or together... hydraulically selective.

In addition, the Duo-Pactor offers these advantages:

- 86 in. pneumatic rolling width; steel roller width 72 in.
- Complete turn-arounds, without backing, on 19-ft roads.
- Widest gross weight range of any roller built . . . 6 to 19 tons, sand and liquid ballasting.
- International "300" prime mover; 4 ft dia. drive wheels for maximum traction.
- Full power hydraulic steering through 180°.

Write today for complete specifications and details.



Spring-mounted oscillating wheels knead road surface.

COMPRESSION in lbs per lineal inch

	Empty	Fully Ballasted
Steel	104	425
Rubber	94	400
Both Steel and Rubber	50	200
Drive Roll	150	300

SEAMAN-GUNNISON also builds the complete line of Gunnison truck and trailer-mounted Distributors and Flushers.

Seaman-Gunnison Corporation

201 LYNN AVENUE • BARABOO 7, WISCONSIN

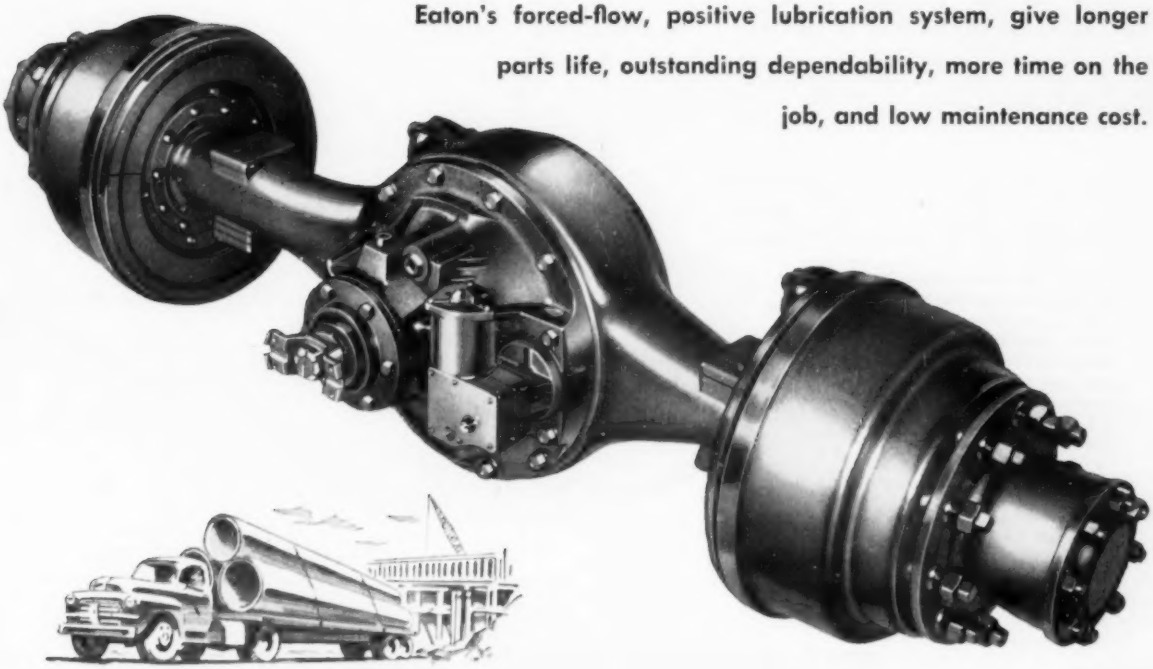
Milwaukee office: 2763 S. 27th Street • Milwaukee 15, Wisconsin • Phone: ORchard 1-0114

. . . for more details circle 266, page 16

EATON 2-SPEED AXLES

Keep Trucks on the Job!

The extra stamina built into the Eaton 2-Speed Axle prevents harmful distortion or misalignment under excessive loads. Practical, down-to-earth design makes maintenance quick, easy, and economical. Eaton's exclusive planetary gearing distributes pressure and wear over four husky planetary gears. These extra-quality construction features, plus Eaton's forced-flow, positive lubrication system, give longer parts life, outstanding dependability, more time on the job, and low maintenance cost.



More than Two Million
Eaton Axles in Trucks Today!

For complete information,
see your truck dealer.

EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

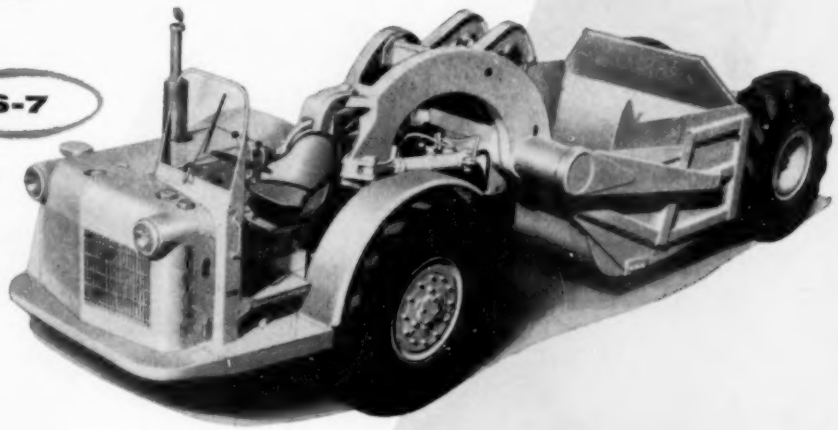
. . . for more details circle 196, page 16

A complete line of 5 "EUC" SCRAPERS...

more WORK-ABILITY... better ACCESSIBILITY

Customer acceptance and preference has made "Euc" Scrapers the fastest selling line in the industry. The simple, practical design of every Euclid scraper model is years ahead of the field in ease of operation and maintenance and in production performance. Like all other Euclid earth moving equipment, "Euc" Scrapers are built to stay on the job longer with less down time for servicing and repair. For example, lever action provides fast, positive and independent control of bowl, apron and ejector without cable or sheave expense. The 4 section cutting blade has long life and assures efficient loading in any material. All major components are readily accessible—a mighty important cost cutting feature—in both the single axle and four wheel tractor models.

S-7



The S-7 has better than 20 h.p. for each yard of payload—a 143 h.p. engine and 7 cu. yds. struck capacity. It's primarily designed for small yardage jobs and for work in close quarters where maneuverability is essential—non-stop turning width is 28 ft.—tires are 18.00 x 25 with 21.00 x 25 optional for work in sand or other tough job conditions.

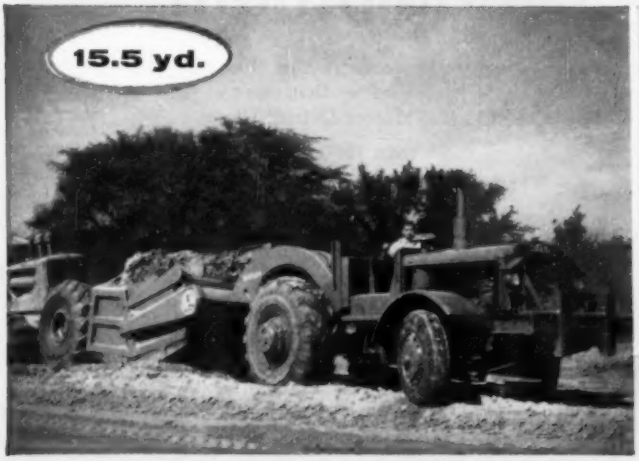
S-12

For medium size jobs or as a utility machine on large projects, this S-12 is the answer. Payload capacity is 12 yds. struck and 16 yds. at 1:1 slope. Powered by a 218 h.p. engine, this model has a top speed of 28 mph with full payload — makes a non-stop 180° turn in 31 ft. Tires are 26.50 x 25 — width of cut is 9' 6".

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

7 to 18 yds. struck payload · 143 to 518 h.p.

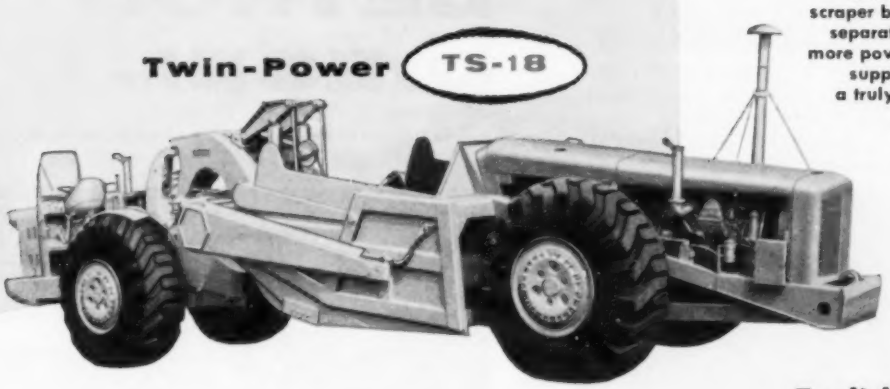
for a wide range of work—small jobs to big projects



This 15.5 yd. Scraper has built-in performance that gets more work done. It is powered by a 300 h.p. engine with either a 10-speed transmission or Torqmatic Drive—has a heaped capacity of 21 yds. at 1:1 slope, 18 yds. at 3:1. Cutting width is 10 feet. Drive tires are 24.00 x 25 standard with 29.50 x 25 available as optional equipment. The extra speed and stability of this "Euc" really pays off on long hauls.

With Torqmatic Drive and 300 h.p. engine, the S-18 hauls heaped loads up to 24 yds. at fast travel speeds—struck capacity is 18 yds. Standard tires are 27.00 x 33 with 33.50 x 33 optional for maximum traction and flotation on tough jobs. In spite of its size and capacity, the S-18 makes a non-stop 180° turn in only 36 ft.

Twin-Power TS-18



The TS-18 is the most recent development in the Twin Power principle pioneered by Euclid. It is powered by two 218 h.p. engines—one in the tractor and one behind the scraper bowl. Both engines drive through separate Torqmatic Drives. Where even more power is required the tractor can be supplied with a 300 h.p. engine. It is a truly self-loading machine due to its tremendous power and traction—works on grades and under conditions that stymie other scrapers and is a one-man earthmoving outfit. Standard tires are 27.00 x 33—with 33.50 x 33 available as optional.

For profitable scraper production and performance

Euclids are your best investment

Euclid Equipment

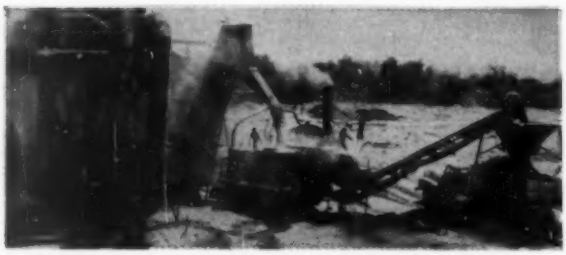
FOR MOVING EARTH, ROCK, COAL AND ORE

EUCLID

Best way to make your contracts pay—

SPECIFY GM

in all your Construction Equipment



PRODUCTION UP 30%—FUEL COSTS CUT 30%

Arizona Sand & Rock Company replaced a 4-cycle Diesel with a 2-cycle GM Detroit Diesel on this pug mill. Despite clouds of dust, maintenance costs dropped 25%—and production control is better with fast-acting, 2-cycle Detroit Diesel power.

KEEP 600,000-YARD CONTRACT GOING

Marsolino Construction Co. relies on GM Detroit Diesel-powered Ingersoll-Rand Gyro-Flow compressors to keep this 600,000-yard contract moving. They report the Detroit Diesels "start easily—are dependable and economical."

CUTS FUEL COSTS 40%—UPS PRODUCTION 25%

When Miami's R. E. Vaughan, Inc. switched from a 4-cycle Diesel to a 2-cycle GM Detroit Diesel on this ditcher, production jumped 25%—fuel costs dropped 40%. They report the Detroit Diesel delivers more power at less cost, too.

TRAVELS 35 M.P.H. ON THE HIGHWAY

Speed like this *between* jobs means more time on the job for this GM Detroit Diesel-powered Warco grader operated by Michigan's Henry Schmid Sons. Company's Detroit Diesel-powered dragline has worked over 17,000 hours on $100 for repairs.

NAME the construction equipment you need—and it's a sure bet that you can get it powered with a General Motors Detroit Diesel.

For more than 150 manufacturers offer GM Detroit Diesel power in over 1,000 different applications—*because it's America's first choice Diesel!* With their reputations riding on every piece of equipment they sell, it's certain these manufacturers pick the best Diesel available to power their products.

And when you specify a GM Detroit Diesel in your construction equipment you get a Diesel that costs less to buy, less to run, and less to maintain.

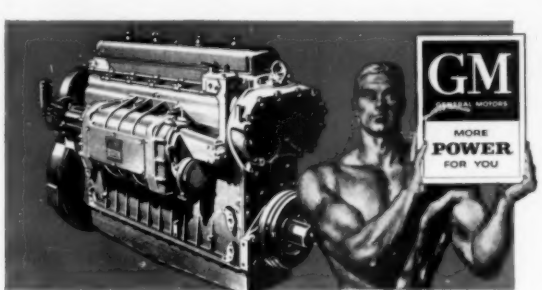
You get a Diesel that delivers more power from a smaller, lighter engine.

And you get a Diesel backed by a nationwide network of GM Detroit Diesel Distributors ready to give you fast service and quick delivery of low-cost parts *day or night.*

Your local GM Diesel Distributor or dealer can give you the list of equipment powered with GM Detroit Diesel engines. Call him today or write direct.

DETROIT DIESEL

Engine Division of General Motors, Detroit 28, Michigan



Single Engines . . .
30 to 300 H.P.

Multiple Units . . .
Up to 893 H.P.

AMERICA'S LARGEST

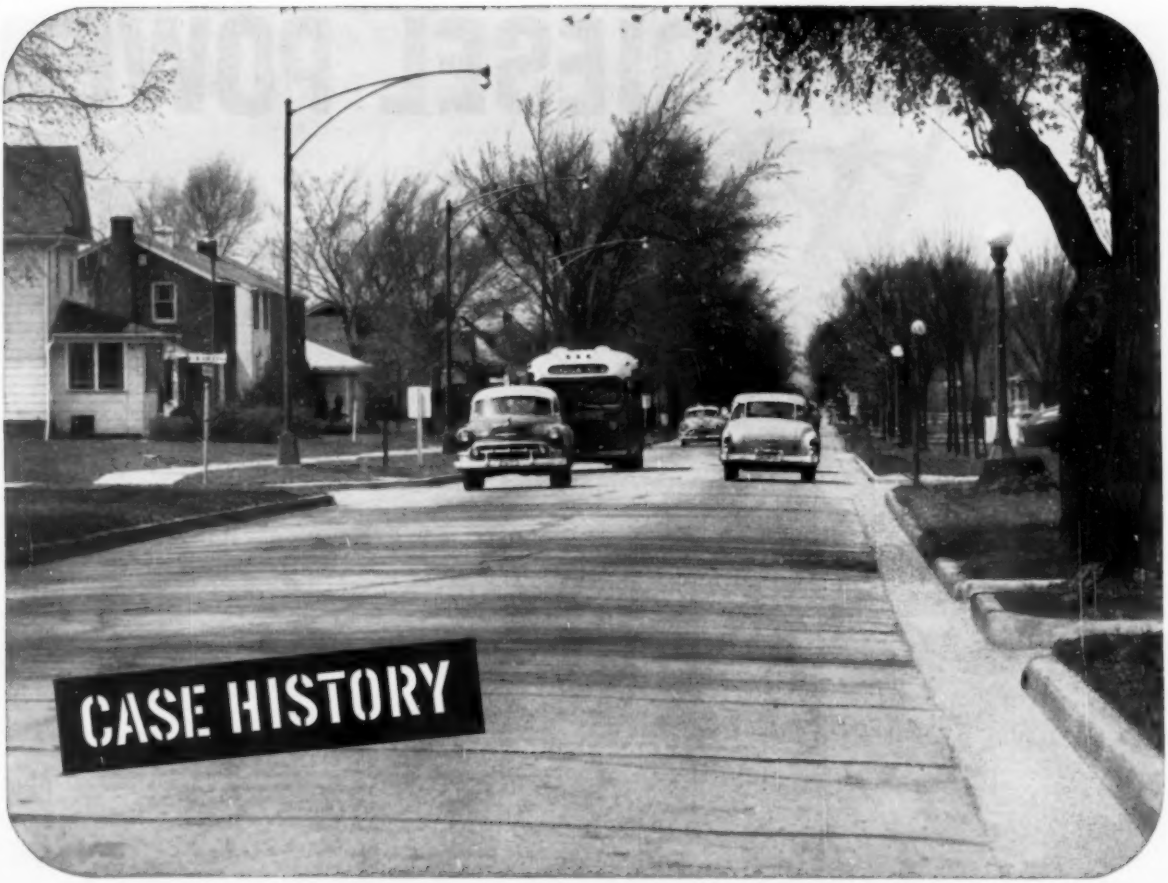
DETROIT DIESEL POWER

NO REPAIRS IN 10,000 HOURS

In 1951, Minnesota's Phelps-Drake Construction Company bought a GM Detroit Diesel-powered Lima Paymaster. And in 1953, they bought a second Paymaster plus a Wellpoint pump—both GM Detroit Diesel-powered. At last report none of the engines had any repairs, were still going strong after more than 10,000 hours. Phelps-Drake also reports production is high—fuel cost low—with Detroit Diesel power.

BUILDER OF DIESEL ENGINES

. . . for more details circle 205, page 16



Property Owners benefit greatly by low-annual-cost service of CONCRETE streets

This is a recent photograph of West Springfield Avenue in Champaign, Ill. The street was paved with concrete in 1922. Now 33 years old, it is a a typical example of the long and economical service rendered by hundreds of miles of concrete streets in all parts of the country.

Today, West Springfield Avenue carries heavy truck, bus and passenger car traffic year in and year out. Like many other veteran streets it is carrying much more and much heavier traffic than could have been foreseen by its designers more than a generation ago.

The cost record of this street exemplifies the economy of concrete pavement. When Springfield Avenue was paved the average lot owner's assessment was $512, including interest. To date the annual cost has been less than $16 per lot. By the time the pavement has served out its life the annual cost will be even lower.

Concrete's ***low-annual-cost*** service is only one reason it is preferred by both public officials and property owners. Concrete streets are also much safer. Their gritty, highly skid-resistant surface grips tires better, permits quicker, safer stops, wet or dry. And concrete's light color, reflecting up to four times more light than dark pavements, not only reduces street lighting costs but also makes residential areas safer for motorists and pedestrians alike. Finally, concrete streets increase property values by "dressing-up" the whole neighborhood with their neat, clean appearance.

For more information about long-lasting, safe, low-annual-cost concrete streets, write for free literature, distributed only in the U.S. and Canada.

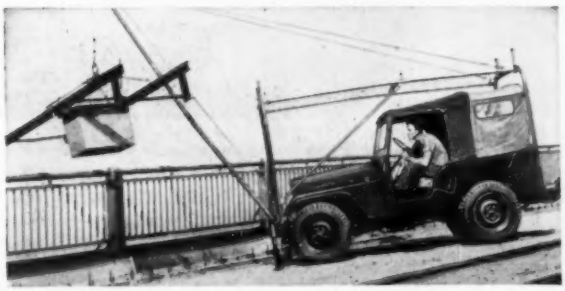
PORTLAND CEMENT ASSOCIATION Dept. 2-28, 33 West Grand Avenue, Chicago 10, Illinois

A national organization to improve and extend the uses of portland cement and concrete through scientific research and engineering field work

. . . for more details circle 234, page 16

Goes anywhere! The Universal 'Jeep' is often the first equipment to reach a construction job, and the last to leave. With the extra traction of its 4-wheel drive, it takes engineers over the roughest ground for first surveys. During construction it carries men and tools wherever they are needed, on or off the road. And when the job is done, it helps speed final inspection work.

How 4-wheel drive 'Jeep' vehicles help contractors save time and money!



'Jeep' with hoist lowers lighting equipment in a bridge deck installation. Because of its light weight, the 'Jeep' can haul materials over new concrete before it is strong enough to support heavy trucks.

'Jeep' Truck with hydraulically-operated back hoe prepares foundations, digs laterals or drainage ditches, and does other jobs too big for hand digging but too small for heavy-duty earth-moving eqnipment.

Vehicles in the 'Jeep' family help speed work and cut costs in almost every phase of construction.

In 4-wheel drive they go up steep grades—through mud, sand and soft earth—where other vehicles can't go. They shift easily into 2-wheel drive for travel at highway speeds. With power take-off or hydraulic lift, they operate many types of equipment from dozer blades to mobile drills for soil sampling. They stand up to the toughest usage—save you valuable time on job after job. Ask your nearest Willys dealer for an on-the-job demonstration or write for information.

The 'Jeep'®
family of 4-wheel drive vehicles

WILLYS... makers of the world's most useful vehicles

WILLYS MOTORS, INC., TOLEDO 1, OHIO

. . . for more details circle 262, page 16

How to

CUT CLEARING COSTS

To help you clear land faster and cheaper, here are NEW IDEAS developed by clearing specialist Wade Lahar Construction Co. These "tricks" will help Lahar and their 22 International tractors finish a 23,500-acre job at Buford Dam 7 months ahead of an 18-month schedule.

One pass levels 18-inch trees—Where clearing to ground level is your primary job, Contractor Lahar recommends a big International tractor and V-shaped cutter. The cutter shown was designed and built by Herman Hackler, project manager, at Lahar's home plant in Mountain Home, Arkansas. Four 200 hp International TD-24's, so equipped, are handling most of the Buford Dam reservoir clearing near Atlanta, Georgia. In typical operation, they cut over so much land that 18 other International tractors are

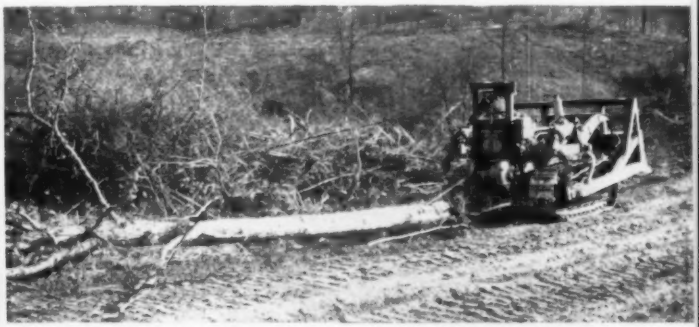
1-to-5 slopes, 1,300 acres per month—Your TD-24 will efficiently clear trees from steep grades as well as from level ground. Here's what Herman Hackler, project manager for Lahar on the $1,611,560 contract, says about this big 200 hp, 8 mph crawler: "TD-24's high-low steering range keeps cutter against the tree until it falls, even on steepest slopes. This factor, plus the "24's" great power, excellent traction, and over-all balance, is letting us crawler-cut 99% of our Buford Dam job, despite slopes averaging 1-to-5, and, in some places, 1-to-4. Our fleet of *22 International tractors*—11 TD-24's (four of them with cutters), six TD-18's, three TD-14's, and two TD-9's—clears and rakes 1,300 acres per month. This production, in our opinion, could not be exceeded by any other make of tractor!"

Burn, turn with one tractor—On big jobs, Mr. Lahar suggests use of one medium-sized tractor to handle burning of brush piles. This leaves bigger machines free for production work. Note how clear the raked ground is behind tractor. When Lahar's job is done, some 14,000 acres will be completely cleared; about 9,400 acres partly cleared. with some trees left standing in the water to benefit future water life.

Team decking boosts output—Where terrain permits, three to six of Lahar's 22 IH crawlers team to rake and pile the cut brush and trees. This gives two advantages . . . (1) rakes, by catching both ends of fallen trees and brush, pick up material lying between tractors which normally would require separate pass . . . (2) one pass per team is all that's needed to provide a clean swath.

kept busy decking and burning. One pass of their 13-ft long, 14-ft wide blade slices saw-like through brush, pine, and mixed hardwoods up to 18 inches in diameter. For scattered trees up to 12 inches in diameter, a similar though smaller cutter is used on a 66 dhp International TD-14A. Both TD-24 and TD-14 have a canopy of 2 and 2½-inch pipe. This protects operator and machine. Entire canopy and cutter assembly pins to regular A-frame . . . can be quickly detached and interchanged with standard or other special blades.

Blade "saws" larger trees—If your clearing work involves trees larger than 18 inches, here's another idea from Wade Lahar Construction Co. Using same mild-steel cutter blade as on smaller trees, have TD-24 operator "see-saw" back and forth a few times to cut the trunk. Just a few seconds' work with the 64,000-lb TD-24 will topple the tree.



Careful in-the-field maintenance boosts output, too. Left, mechanic uses compressed air to blow dirt and leaves from TD-24 radiator core. Right, special steel tooth, 2½ ft long with 18-inch overhang, is welded to TD-24 blade. Four teeth and top blade extension are used per raking tractor.

Winches logs from swamp—Clearing from marshy areas may present you with quite a problem too. Wade Lahar Construction Co does this work, 1% of their 23,500-acre Corps of Engineer job, with chain saw crews and winch-equipped TD-9 and TD-18 crawlers. After winching in, tractors skid timber to central area.

International

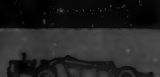
makes every load a pay load

INTERNATIONAL HARVESTER

Industrial Power

INTERNATIONAL HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO 1, ILL.

A machine size for every job . . . see your nearest INTERNATIONAL INDUSTRIAL POWER DISTRIBUTOR for details.



PAYSCRAPERS
12 yds. and 18½ yds.

CRAWLER TRACTORS
8 Models . . 40 to 200 hp

DIESEL, GAS ENGINES
18 Models . 16½ to 200 hp

WHEEL TRACTORS
6 Models . . . 9 to 55 dhp

ALSO: International Draft Loaders . . . International Scrapers, Bottom-Dump Wagons . . . International Superior Pipe-Boom Tractors . . . and International Trucks.

Cut Downtime Losses by Having Tires Repaired or Retreaded While Your Equipment Is Idle

SECTION REPAIRS — Can be handled on any tire with Firestone's repair facilities.

FIRESTONE RETREADS — A special cut-resistant tread rubber compound is added. Scientifically controlled pressure is applied to eliminate air pockets and to give maximum adhesion.

GET GOOD, FAST SERVICE AT Firestone

TRACTION CAPS OR FULL CAPS AVAILABLE FOR THE FOLLOWING TIRE SIZES

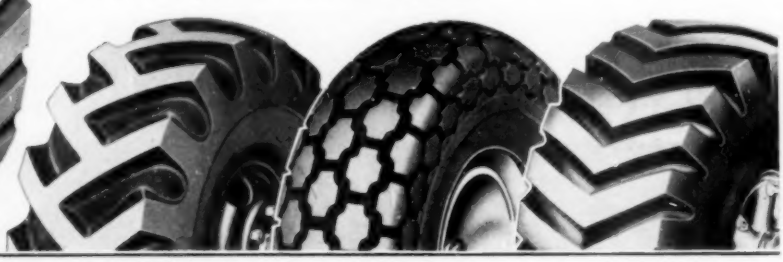
8.25-20	18.00-24
9.00-20	18.00-25
10.00-20	21.00-24
11.00-20	21.00-25
12.00-24	24.00-25
13.00-24	24.00-29
14.00-20	24.00-32
14.00-24	27.00-33
14.00-25	29.5 x 25
16.00-24	30.00-33
16.00-25	

YOU'RE time and money ahead when you let Firestone handle your repair and retreading needs.

You cut your tire maintenance costs because Firestone is equipped to do the job better, quicker and at lower cost.

You save with Firestone Traction Cap retreads or Firestone Full Cap retreads because they stand up longer and keep your downtime at a minimum. Firestone Retreads have the proved Firestone new tire tread design for greater traction, greater driver control, more hours of service.

Call your Firestone Dealer or Store for faster service on all your repair and retreading needs.



GROUND GRIP FULL CAP | **ALL NON-SKID FULL CAP** | **ROCK GRIP FULL CAP**

Enjoy the Voice of Firestone on radio or television every Monday evening over ABC

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. . . for more details circle 198, page 16

GULF PRODUCTS *and* FINE SERVICE

keep equipment rolling

on Schuylkill River Expressway Project

Lipsett, Inc., New York, New York has the contract for the Schuylkill River bridge and its approaches for the Schuylkill River Expressway, which will connect with the Pennsylvania Turnpike near Philadelphia, Pennsylvania. Gulf products are keeping this contractor's modern equipment operating efficiently on the job.

IT'S a faster, smoother job when equipment delivers top performance—and the use of quality petroleum products is one of the best guarantees of that kind of performance.

That's why leading contractors, like Lipsett, Inc., select Gulf as their supplier. They have found that Gulf quality lubricants and fuels provide an extra margin of protection against mechanical delays . . . and they appreciate Gulf's prompt delivery service and helpful petroleum engineering counsel.

Send the coupon below for your copy of our new brochure, "Gulf and Your Business."

Gulf Oil Corporation • Gulf Refining Company
1822 Gulf Building,
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GULF

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Gentlemen:

Please send me a copy of your new brochure, "Gulf and Your Business."

Name.....

Company.....

Title.....

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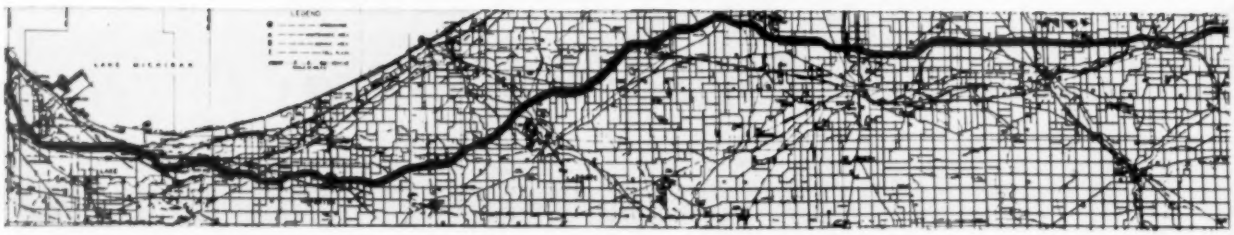
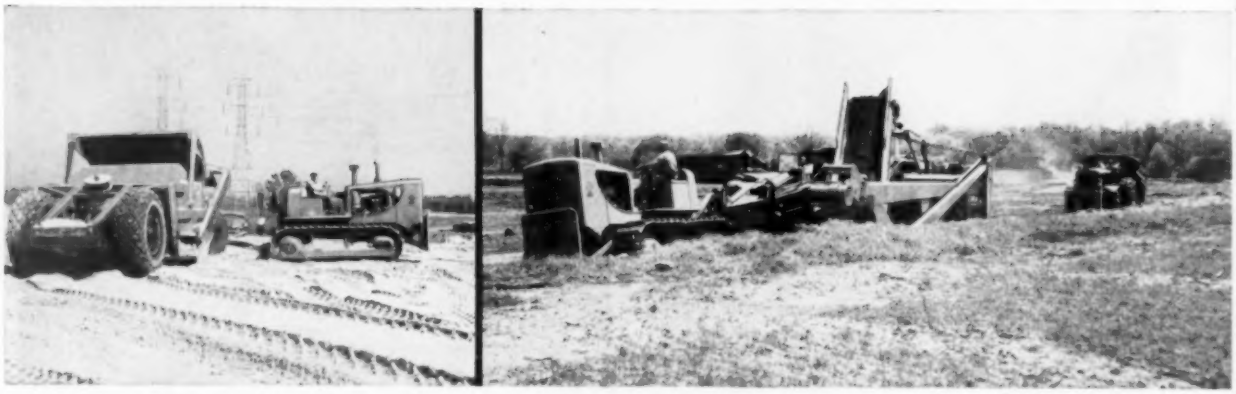
. . . for more details circle 208, page 16

The Indiana Turnpike...1955



from the Illinois line to the Ohio



used ALLIS-CHALMERS equipment

More and more contractors, on all types of construction jobs, are taking full advantage of Allis-Chalmers equipment to bring new efficiency and economy to their production schedules. See your Allis-Chalmers dealer now . . . for the facts about *advanced basic design* and how it can help *you* do more work at lower cost.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

equipment report

line...leading contractors

to move BIG YARDAGE...FAST

Contractors working on this great Indiana toll road used more than 200 Allis-Chalmers crawler tractors, motor scrapers and motor graders.

ALLIS-CHALMERS

. . . for more details circle 264, page 16

F-100 8-ft. Pickup—GVW 5,000 lbs.

T-800—GVW 42,000 lbs.; GCW 65,000 lbs.

FORD BIG JOBS can mean

FORD EXPERIENCE IN HEAVY DUTY ENGINES PAYS OFF . . .

- **Much longer peak engine performance!**
- **Much less DOWN TIME on the job!**

Ford Trucks for '56 save you money right from the start. And, they keep on saving with their extra-sturdy, long-life engine design.

For instance . . . Ford Engineers have now introduced into all heavy-duty engines the greatest valve advancements ever. As an example, see the exhaust valve in diagram on right page. The valve stem is hollow and partially filled with powdered sodium. When the sodium gets hot, it *turns into a liquid.* As it moves up and down, it carries heat away from valve head—*allows it to operate up to 225° cooler!* Result: a cleaner-running, more burn-free, longer-lived valve face.

Ford's long-lasting engine design pays off for you in every way. You save money on parts replacements such as piston rings and bearings. You save on shop labor—extend time between preventive maintenance jobs like valve adjustments, valve grindings, compression tests, ring jobs and the like.

And you can save on driver costs if you can keep trucks out of the shop and on the road. Yes, you save in every way when you get more work done per truck!

There's a Ford Truck for every trucking job. Before you buy your next truck, Test Drive a Ford Economy Truck.

FORD TRUCKS LAST LONGER

Certified by independent insurance actuaries for the ninth consecutive year! Studies of over 10,068,600 current license registrations show that Ford Trucks last up to 9.9% longer than any of the other 4 leading truck makes!

F-900—GVW 29,000 lbs.; GCW 60,000 lbs.

BIG SAVINGS in your business

Hauls up to 3000 lbs. more than other 6-wheelers—New Ford T-800

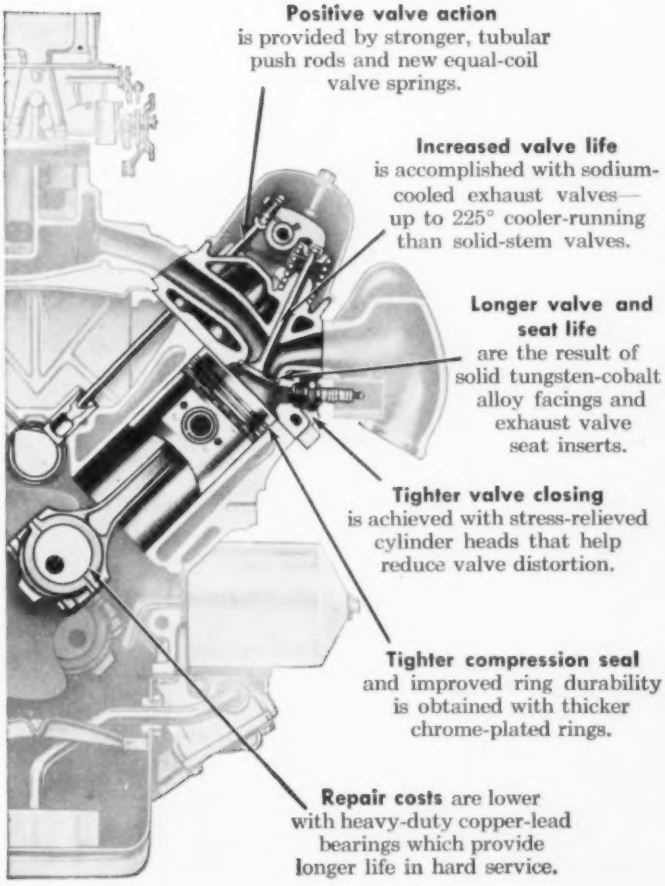
● New power and hauling capacity of the Ford Tandem BIG JOB cuts hauling time on every run—makes giant cargos seem lightweight. You have a choice of two gas-saving Short Stroke engines. Either the 190-h.p. *Torque King* Y-8 or, the 200-h.p. *Torque King* Special Y-8.

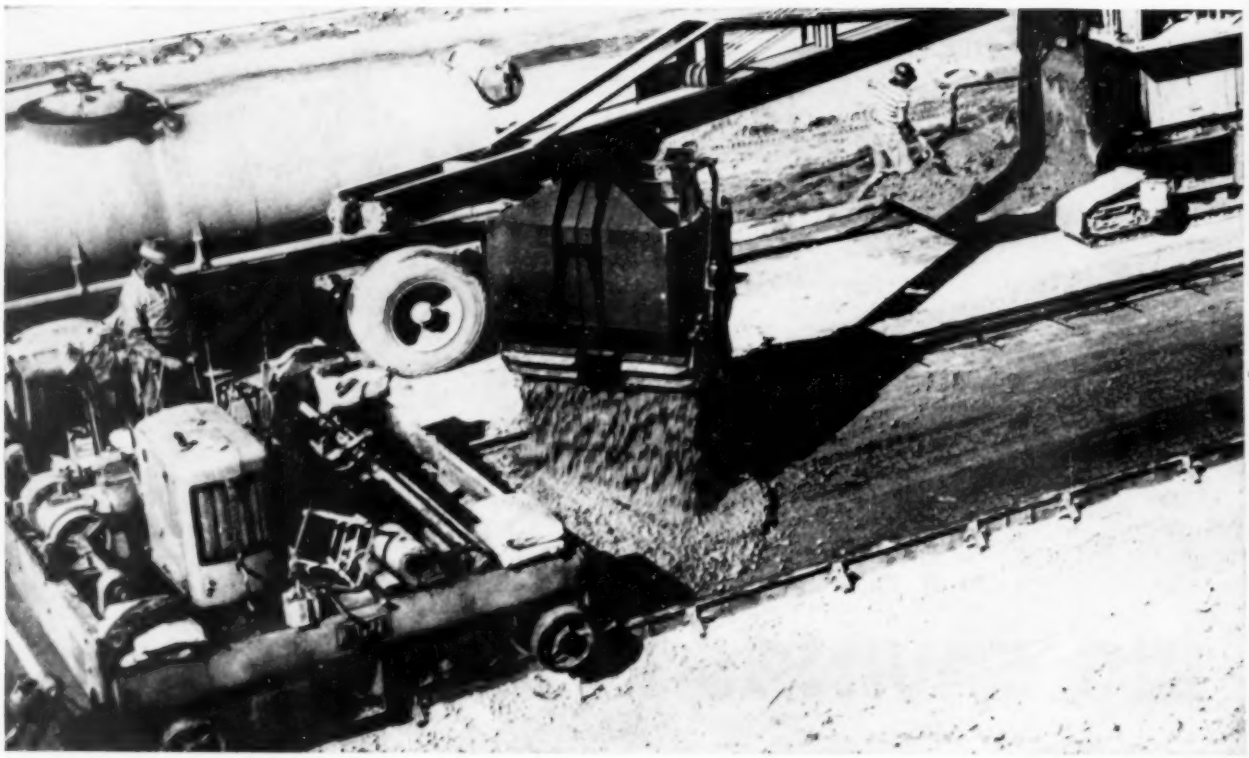
You have new engine advancements for longer life (some explained and illustrated at the right).

New high-capacity tubeless tires, heavy-duty 5-speed transmission and Power Steering are standard equipment, at no extra cost. Two 3-speed auxiliary transmissions and full-air brakes are available at low extra cost.

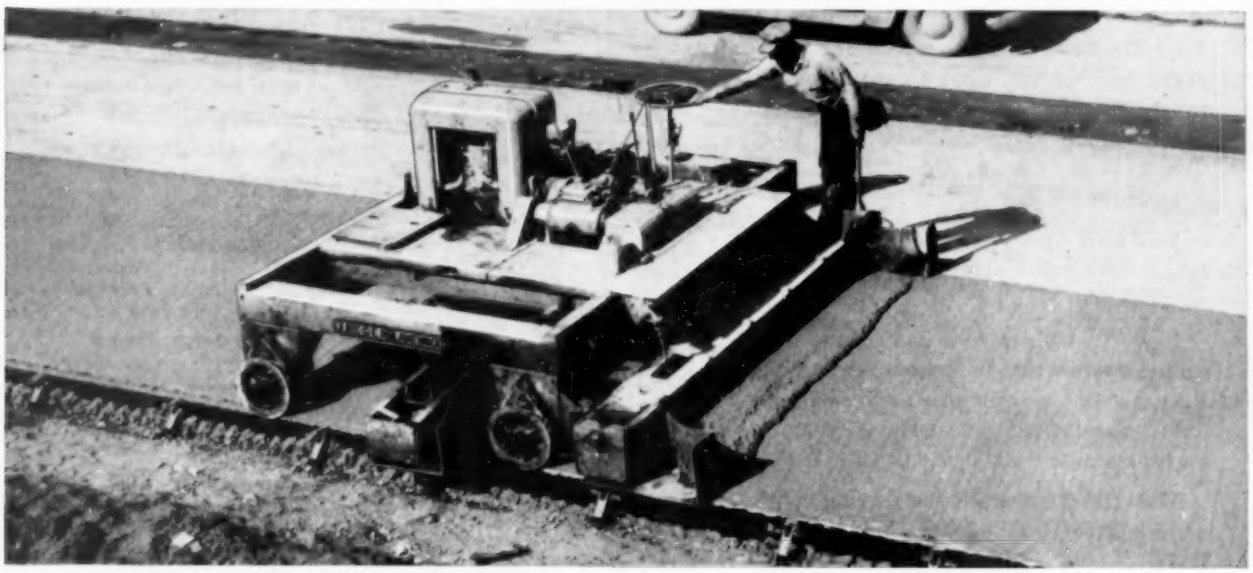
New *Driverized* Cabs for driving comfort and convenience have *Lifeguard* Design safety features found in no other truck. Lifeguard steering wheel helps protect driver from steering column; Lifeguard door latches help keep doors from jarring open in case of accident.

. . . for more details circle 200, page 16


Positive valve action is provided by stronger, tubular push rods and new equal-coil valve springs.
Increased valve life is accomplished with sodium-cooled exhaust valves—up to 225° cooler-running than solid-stem valves.
Longer valve and seat life are the result of solid tungsten-cobalt alloy facings and exhaust valve seat inserts.
Tighter valve closing is achieved with stress-relieved cylinder heads that help reduce valve distortion.
Tighter compression seal and improved ring durability is obtained with thicker chrome-plated rings.
Repair costs are lower with heavy-duty copper-lead bearings which provide longer life in hard service.



SCREW AND SCREED SPREADING ON FREEWAY: Here Webb & White, the contractors, are using only one man with a Jaeger Screw and Screed Spreader to perform the following functions: (1) Knock down and thoroughly re-mix the concrete piles, (2) Spread the material and compact it solidly against subgrade and side forms, (3) Make rough strike-off with plate immediately behind spreading screw, (4) Make precision strike-off with oscillating 12″ screed, and (5) Vibrate slab along forms. This results in a slab of dense, uniform texture with an ideal surface for the finishing machine to work on. Santa Ana Freeway, California.



FINISHING PITCHED SLAB WITH DIAGONAL SCREED: When material has been properly placed and struck off (best done by Jaeger Screw Spreader), finishing is largely a one-man job with the Jaeger-Lakewood Finisher. Note small roll of material ahead of finisher, assuring uniform finishing compaction under the screeds. Note diagonal setting of rear screed, controlled by operator's hand wheel. This exclusive Jaeger-Lakewood feature insures proper finishing to high side of pitched or super-elevated slab with little or no carry-back by shovelers. Penn-Lincoln Parkway West, near Carnegie, Pa., Frank Mashudi, subcontractor for County Construction Co.

24′ BASE LAID AS FAST AS TRUCKS CAN DELIVER: Working at only half their capacity, these tandem Jaeger Aggregate Spreaders are laying 2000 tons per 10 hours, put down in three 4″ layers placed to 24′ width in blended 12′ strips. Material is B-2 graded aggregate base. After bonding it is surface treated with asphalt and later a drag treatment is put down. Job is on Highway 220 south of Roanoke, Va., Pioneer Construction Co., Inc., contractors.

Jaeger 1956 paving "tools"

One-man machines that handle big production with labor-saving accuracy

To meet the increasing needs of paving contractors we have greatly expanded production of Jaeger paving equipment for 1956. In planning this year's work, take full advantage of the labor-saving features of these machines, which are in stock and available for delivery through your Jaeger distributor:

PLACING 18″ THICK AIRPORT SLAB: On Carswell Air Base, Fort Worth, Texas, after material was remixed, spread and struck off by Jaeger Screw Spreader, Nolan Brothers, Inc., used pneumatic vibrators mounted across rear of spreader to vibrate the concrete to its full 18″ depth. Jaeger-Lakewood finishing machine (following at left) then finished the surface. For lesser thicknesses of vibratory concrete, finishing machine can be equipped with tube or Jaeger "bullnose" vibratory front screed.

. . . for more details circle 222, page 16

Jaeger Concrete Spreaders: Exclusive re-mixing, compacting spreader screw and adjustable strike-off, plus the additional advantage of oscillating 12″ screed for precision strike-off where needed on high production work. Gives you a 3-screed paving team when used in combination with Jaeger-Lakewood Finisher.

Jaeger-Lakewood Finishers: Fast, flexible finishing machines with wide range of independent screed and traction speeds, plus the additional exclusive advantage of diagonally adjustable rear screed for use on pitched slab and super-elevated curves.

Jaeger Aggregate Spreaders: Low cost self-propelled machines that accurately lay all types of base and surface aggregates, free-flowing bituminous mixtures and plant-mixed stabilized soil as fast as trucks can deliver.

For complete information, see your Jaeger distributor or send for Paving Catalog.

THE JAEGER MACHINE COMPANY

223 Dublin Avenue, Columbus 16, Ohio

AIR COMPRESSORS • PUMPS • CONCRETE MIXERS
TRUCK MIXERS • LOADERS

Bucyrus-Erie 38-B shovel excavated one-third of total yardage on this job with rock and conglomerate predominant material.

CALIFORNIA CONTRACTOR PASSES TOUGH TEST ON FIRST BIG JOB

When this Southern California contracting firm was awarded the contract for rebuilding 8.16 miles of secondary highway in east-central California, work plans had to be made carefully. A few of the reasons: the job was in a remote location between Bridgeport and the Nevada line, 8000 feet up in the Sierras, and through plenty of tough granite rock.

Breakdowns were the principal worry, for this was the biggest job the firm had ever tackled. Two major decisions were made: (1) to use equipment known for dependability, and (2) to service each piece up to factory-approved standards.

A new 1½-yd. Bucyrus-Erie 38-B shovel took over the toughest excavating. Pre-bid estimates were based on 1,000 cubic yards of excavation per 8-hour shift for this machine. Weeks went by and the 38-B worked a full shift daily with no lost time, handled boulders up to 72 inches in diameter, and dug rock so well that blasting was negligible. Final yardage figures for the long-haul phase of the job showed the 38-B averaged up to 1,200 cubic yards per shift — 20% better than the pre-bid estimate.

This same 38-B, equipped with dragshovel front end, just completed another difficult job for its owner, I. L. Croft & Son, Inc. of Saugus, California. This one was the construction of an aqueduct for the City of San Diego and, once again, Bucyrus-Erie dependability and big-output performance helped the owner finish the job on time, and at a profit.

That same kind of performance is ready to go to work for you — in excavators from ⅜ to 4-yd. sizes. See your Bucyrus-Erie distributor soon for complete information. 99E55C

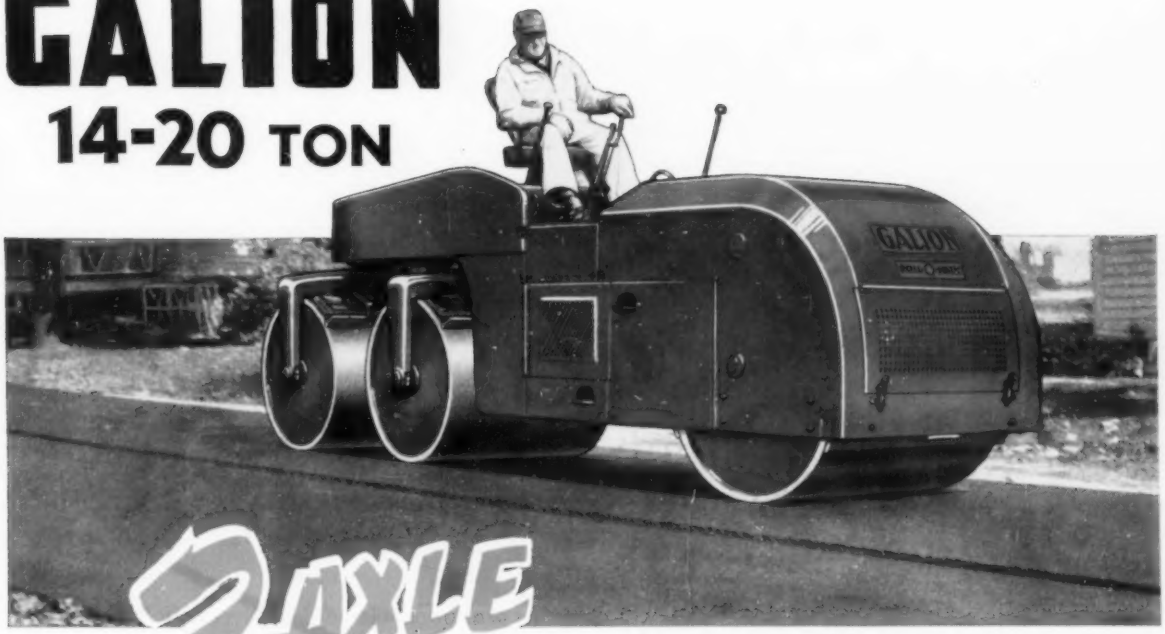
Here the new highway hugs the bank of the East Walker River, 6,000 ft. up in the Sierras.

BUCYRUS ERIE
South Milwaukee Wisconsin

75 YEARS OF SERVICE to Men Who Shape the Earth

. . . for more details circle 181, page 16

GALION
14-20 TON



3 AXLE TANDEM ROLLER

The Galion 3-Axle Tandem Roller gives you a considerably smoother finish surface, and up to 60% greater tonnage of material compacted per day than with conventional tandems. You get faster and better compaction of joints and seams. Elimination of cross-rolling saves you time and money.

Other features include Galion ROLL-O-MATIC Torque Converter Drive . . . Synchronized hydraulic steering of twin guide rolls . . . Dual operating controls . . . Rugged straight-line spur gear final drive . . . Complete and easy accessibility of all operating parts. Write for literature.

*Utilizing a General Motors-Allison Torque Converter

ESTABLISHED GALION 1907

MAIL THIS COUPON TODAY

THE GALION IRON WORKS & MFG. CO.
GALION, OHIO, U.S.A.

ROLL-O-MATIC* TORQUE CONVERTER DRIVE IS STANDARD EQUIPMENT

GALION gives you the most effective and economical driving power obtainable. The ROLL-O-MATIC Torque Converter Drive differs from a fluid coupling drive. A fluid coupling transmission requires a manual gear shift mechanism, and the fluid coupling itself never multiplies engine power.

The Galion ROLL-O-MATIC Torque Converter Drive has no gear shift mechanism. Furthermore, it automatically MULTIPLIES the engine driving force by means of oil in motion instead of by transmission gears. It automatically APPLIES the driving force as the work demands. When the Governor Lever is moved to a selected rolling speed, the engine power will be applied and regulated AUTOMATICALLY —

UP HILL
ON THE LEVEL
DOWN HILL
Rolling speeds as low as .8 m.p.h. and up to 5.5 m.p.h. are possible. Reversing action is velvet-smooth; shock loads are eliminated.

THE GALION IRON WORKS & MFG. COMPANY
Dept. RS-26 Galion, Ohio, U.S.A.

Please send me literature on the Galion Rollers checked.

☐ 3-Axle Tandem ☐ Three-Wheel ☐ Trench
☐ 2-Axle Tandem ☐ Portable

PERSON _____

FIRM _____

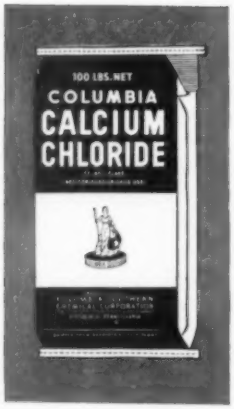
STREET _____

CITY _____ STATE _____

. . . for more details circle 203, page 16

how much
production time
and wages are lost
in your town
every time it snows

Safeguard winter traffic with COLUMBIA CALCIUM CHLORIDE



Roads inadequately protected against winter weather cost motorists an astoundingly high sum in lost wages. Production schedules are disrupted in plants. Lost time and income are never recovered. The entire community suffers.

Columbia Calcium Chloride, applied directly to ice or packed snow makes roads ready for instant use.

Cinder or sand stockpiles treated with Columbia Calcium Chloride will not freeze. Abrasives remain free and loose for easy spreading. Abrasives imbed themselves in icy surfaces for better traction . . . help prevent skidding . . . will not blow away.

Abrasives treated with Columbia Calcium Chloride stretch 3 times farther than those untreated, thereby saving money, time and strain on your spreading crews.

Safeguard winter traffic and your motorists' pay checks by using Columbia Calcium Chloride on your roads and stockpiles. Order your supplies now through your nearest Columbia-Southern district office.

COLUMBIA-SOUTHERN
CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland • Boston New York • St. Louis • Minneapolis New Orleans • Dallas • Houston • Pittsburgh • Philadelphia • San Francisco
IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

. . . for more details circle 193, page 16

Versatile "D" Tournapull

has a place on EVERY dirtmoving job

Every "big" dirtmoving job breaks down into work sections . . . some suitable for "big" equipment . . . some suitable for "small" equipment.

The improved D Tournapull fills the need for a fast, flexible, self-propelled scraper which works economically on both big and small-yardage assignments and on both long and short hauls.

Its capacity is 5.9 cubic yards, struck, or 7 cubic yards, heaped. It is large enough and fast enough for profitable use in pusher fleets . . . yet small enough for one-man self-loading. It cuts delays and expense for small yardage sections, clean-up, access roads, shoulders, drainage and other headache jobs that normally eat into your profits.

Not only is the "D" highly versatile, but it runs from one location to the next at speeds to 28 mph.

It travels anywhere . . . over highways or cross-country, over curbs, railroad tracks, bridges. It works fast . . . moves more earth in less time than big crawler tractor-scraper combinations costing thousands of dollars more.

Pictures show some of typical applications. Look over your current dirtmoving projects and you'll find many of these assignments . . . and others . . . where "D" can speed completion and cut your costs.

If you want more information on the D Tournapull, or if you would like to see a demonstration on your job, call your LeTourneau-Westinghouse Distributor. He is always at your service.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-885-G-b

Backfills around culverts

Backfills around buildings

Shapes backslopes

Fine-grades before paving

Blades shoulders

Cuts drainage ditches

Spreads gravel

Handles clean-up

Spreads top-dressing

Fills hoppers

Does production dirtmoving

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

UNIT Model 510
Challenger
on-the-job

UNIT 3/8 yd. Trenchoe *"Pinch Hits"* for Crane on a Pipe Lifting Job

On pipe line construction jobs, the UNIT Challenger provides "Double Duty Performance" . . . It trenches . . . picks up pipe strung along the side . . . positions pipe for permanent installation . . . then backfills. UNIT Challenger is ideal because it has a full 360° swing . . . and the FULL VISION CAB gives unmatched visibility *on all sides*. It will pay you to investigate such UNIT features as **One-piece-cast main machinery case . . . Modern transmission design . . . Alloy steels and forgings . . . Involute splines . . . Force feed lubrication . . . Straight-in-line engine mounting . . . Hydraulic actuated clutches . . . Full floating, trunnion mounted taper drums . . . Torque Converter . . . Safety promoting Full Vision Cab** — and many other advanced features. Write for copy of Bulletin C-800.

UNIT CRANE & SHOVEL CORP.
6407 WEST BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U.S.A.

SHOVELS • DRAGLINES • CLAMSHELLS • CRANES • TRENCHOES • MAGNETS

. . . for more details circle 246, page 16

D Tournapull Rear-Dump's ability to turn around in only 24'8" enables it to spot fast in tight quarters. With 10 to 11 passes of ¾-yard shovel, unit loads 8 pay yards in about 3 minutes. Big 10'11" x 5'10½" bowl opening, with low rear entry, makes loading easy.

Hauling from pit to crusher, "D's" average 900' distance in 1½ minutes... returning in about 55 seconds. Units' 4-wheel multiple-disc air-brakes assure positive control at all times... give operators complete confidence on winding roads and steep grades.

"Better than trucks where going is tough"

says Superintendent R. E. Merritt of Oregon's Jackson County

To speed delivery of rock from quarry to crusher, Jackson County Highway Dept. teamed up 2 D Rear-Dumps to handle all crusher requirements.

On the job the "D's" encountered tight loading quarters, rough quarry terrain and underfooting, and adverse grades on haul roads. Unit's speed and maneuverability, plus ease in spotting in restricted places, helped keep crusher well supplied with rock at all times.

1800′ cycle in 9¾ minutes

When pictures were taken, the 11-ton "D's" had already moved 28,000 yards of rock to the crusher. Time studies showed that each "D" was averaging 8 pay yds. per load... 1800′ cycles were completed in about 9¾ minutes, including 3.65 min. to load and a 3.95 minute waiting time.

"Work in closer quarters"

Comparing the operation of the Rear-Dumps to trucks, Supt. Ralph E. Merritt said, "The D Rear-Dumps are a lot better than trucks where the going is tough." Operator Floyd Sherman added, "'D's' can get around in a lot closer quarters, too."

Safer than trucks

Besides being faster and more maneuverable than ordinary trucks on rough roads, D Rear-Dumps are also safer when dumping loads. Front-wheel-drive on "D's" keeps power and traction on solid footing well ahead of rear wheels. Because body does not need to clear frame, springs, axle, or differential, its center of gravity stays low, even during dumping. Over-size multi-disc air brakes — with more braking surface on one wheel than comparable-size trucks have on all four — prevent creeping or rolling, especially when dumping.

If you have a tough hauling job... better check D Rear-Dump's advantages for yourself. See how the 11-ton "D", 22-ton "C" or new 35-ton "B" can help you.

Tournapull—Trademark Reg. U.S. Pat. Off. DR-903-P-b

At crusher, "D" dumps 8-pay-yard load in 20 seconds. Operator Floyd Sherman said, "You can get around in a lot closer quarters with 'D's' than you can with a truck." He added, "These D Rear-Dumps are not as hard on the operator as many other types of haulers."

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Contractor Takes Tractair to Church and Solves Unusual Construction Problem

Remodeling of this large church depended on plenty of air power.

"Inside" job was confined, crowded, with poor footing.

Here's how a construction firm found the answer with a Le Roi Tractair.

A self-propelled Le Roi Tractair compressor went to church recently to help the Caspian Construction Company of Caspian, Michigan with an unusual air-power problem.

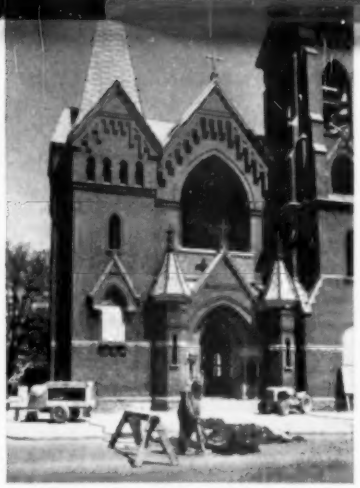
The job was different and difficult. St. Mary's Church in Wausau, Wisconsin was to be remodeled inside, from the ground up. Plenty of air power was needed to work essential tools. But long hose wouldn't work because of friction loss and danger of abrasion from debris. Not even small trucks could get inside the building.

To solve the problem, a Le Roi 125 Tractair, capable of working in crowded conditions . . . maneuvering in tight corners . . . "stepping" through loose, deep sand, was driven into the church. In this way continuous air power was provided for the job, without tying up additional equipment or men.

The contractor states, "The Tractair was a life-saver on this job, due to the fact that it is so mobile. It did a very fine job for us and served all of our needs at a very low cost of operation."

Ready to work at any job. Tractair, a combination 42-hp wheel tractor and 125-cfm air compressor, can be equipped with a variety of drilling attachments, front-end loader, backhoe, rotary sweeper, backfill blade, and operates Le-Roi-Cleveland air tools — rock drills, pavement breakers, clay spades, backfill tampers.

On this job, the Tractair functioned as a specialized tool providing a complete answer to the need for dependable air power inside the church. The Le Roi Tractair was also used outside the church to break concrete, along with a portable Le Roi Airmaster compressor. On many jobs, the Tractair can replace a truck-towed compressor with a 50% saving in equipment costs and manpower — and unlimited savings in time.



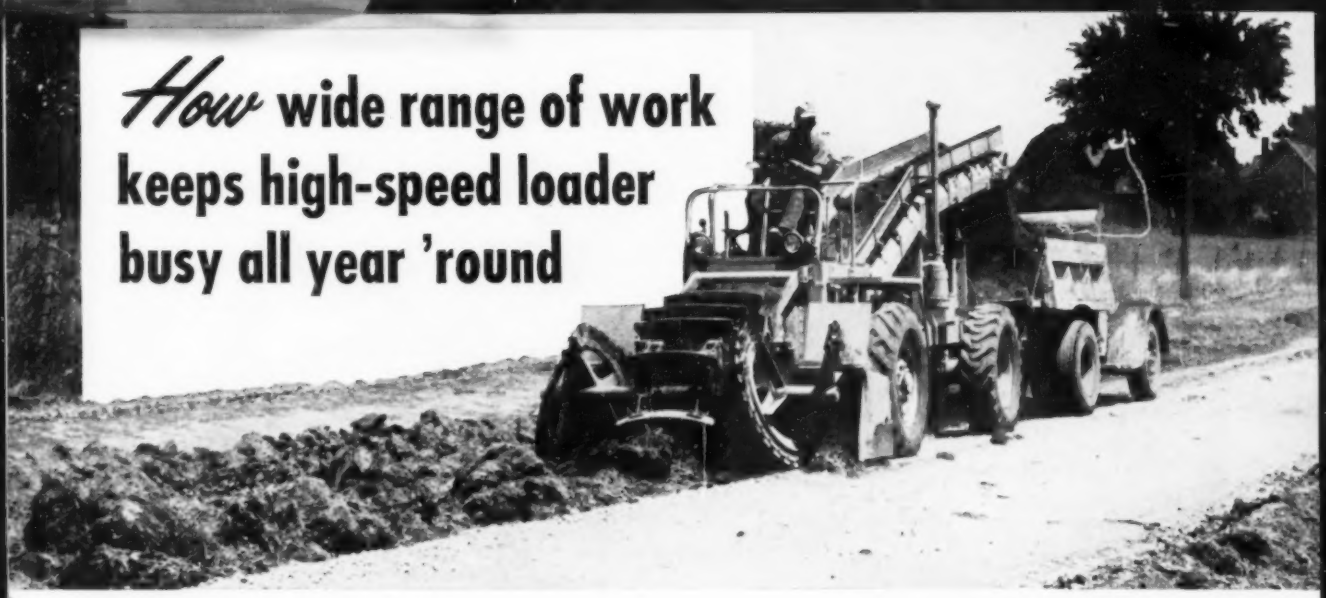
(Above) Work outside St. Mary's church in Wausau, Wis., used Le Roi Tractair and Le Roi Airmaster compressor to break concrete.

(Below) Inside church, Le Roi Tractair provided air power when and where needed because it can move about in confined, crowded places.

Le Roi Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin also manufactures portable and stationary air compressors, air tools, and engines. Write today for information about any of these products.

T-48

How wide range of work keeps high-speed loader busy all year 'round



On this road-widening job, surplus materials are loaded from windrow into truck in a matter of seconds. No traffic interference.

Here is a heavy-duty, self-propelled, belt-type loader having a wide range of applications for highway departments. It loads practically any type of loose material out of windrows or stockpiles. In addition to high loading capacity, it gets around fast from job-to-job.

Use Adams TraveLoader for picking up surplus material on road and street construction or reconstruction. Use it for loading materials out of borrow pits and stockpiles. TraveLoader works fast in dirt, sod, sand, gravel, crushed stone, slag, cinders, snow. It loads topsoil for landscaping with no prior preparation.

How it works

TraveLoader loads in any one of a wide range of 5 working speeds from 0.29 to 1.9; has 5 travel speeds from 3.90 to 26.7. The floating, revolving, screw-type feeder automatically adapts itself to the load ahead and places a continuous flow of material on the conveyor-belt. Trucks can be loaded with loose materials at up to 10 yards per minute. Travel speed range makes it easy to keep TraveLoader working to capacity. Trucks load behind loader, do not interfere with passing traffic. Moves job-to-job over highways and city streets at speeds to 26.7 mph.

Heavy, durable construction

All-welded, box-construction, one-piece frame extends full length of machine. Heavy-duty front and rear axles, sturdy feeder mechanism, rigid conveyor with sealed-for-life roller bearings, give TraveLoader the necessary strength to handle heavy loads at fast speeds with minimum downtime and maintenance. *Available with gasoline or diesel engines.*

Easy to operate

You will like TraveLoader's centrally-located control station . . . up out of the dust, permitting clear vision in all directions. Easy, fast, hydraulic controls, give quick adaptability to any working condition.

Get all the facts on the Adams TraveLoader from your LeTourneau-Westinghouse Distributor.

Side-shiftable cross conveyor (optional) loads trucks on either side of machine, assures proper balancing of load. A great time-saver in materials yards. Conveyor position power-controlled from operator's cab.

Cities have many uses for TraveLoader. For instance, ice and snow on city streets can be loaded at the rate of 12 to 20 yards per minute. TraveLoader finds work the year 'round.

Here a contractor cuts and loads gravel out of a natural bank. Many contractors and highway departments use TraveLoader for loading stockpiled materials of all kinds.

AL-5-G-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

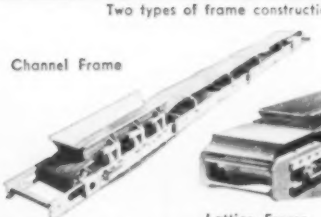
A Subsidiary of Westinghouse Air Brake Company

Whatever your material-moving job

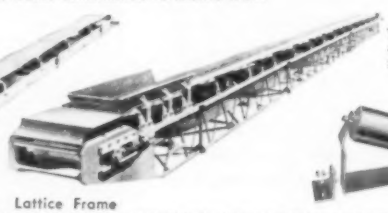
A Universal radial stacker installation for stockpiling.

Two types of frame construction to choose from:

Channel Frame



Lattice Frame



Triple troughing roll with self cleaning mounting and self aligning, sealed for life bearings

Universal Portable Conveyor with hydraulic hoist

there's a UNIVERSAL CONVEYOR that does it for less

Sectionalized construction and simple, flexible design are the main reasons for Universal Conveyors' low cost and versatility. Head sections, intermediate sections in many lengths, and tail sections are combined with Universal's complete line of conveyor accessories to handle any job efficiently and economically. Simple design makes it easy to set up, move, or alter your Universal Conveyor for different jobs.

Universal offers these quality features assuring you extra years of use and low cost maintenance.

- Anti-friction, sealed for life, or grease-type bearings
- Self cleaning mountings and tail pulleys
- Adjustable belt flashings
- Screw or Gravity type take up to maintain belt tension
- Lagged drive pulley
- Extra heavy cold rolled shafts

Send for free literature. For greater savings, ask for information on Universal's assemble-yourself Pre-Fab Conveyors.

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

Whatever your material moving requirements, there's a Universal Conveyor to do the job profitably. And Universal's complete engineering services are available to design your installation.

UNIVERSAL ENGINEERING CORPORATION
631 C Avenue NW, Cedar Rapids, Iowa

Gentlemen: Please send me information on —

☐ Universal Conveyors ☐ Universal Pre-Fab Conveyors
☐ Radial Stackers ☐ Conveyor Engineering Service ☐ Conveyor Idlers

Your Name

Company Name

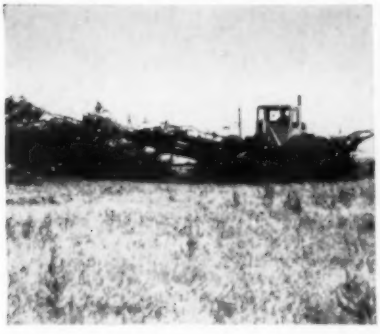
Address

City State

. . . for more details circle 261, page 16

Pictures of a tractor in a hurry!

On this road-widening job near Denison, Iowa, a grove of 60 ft. trees ranging from 10 to 15 inches in diameter had to be removed. Tournatractor did the entire job alone. First it dozed dirt from around the base of each tree to cut surface roots. Then, with dozer blade raised near maximum 54 inches, Tournatractor pushed trees over. Complete uprooting task averaged 3 to 4 minutes per tree. Said the tractor operator, Elmer Schwarz, "This rig did a wonderful job in tree removing!" Its instant-shift transmission kept maximum "push" on the tree at all times . . . quick-shift into high-speed reverse let unit move away quickly from falling trees.



Speeds clean-up, push-loading, & pulling

After uprooting trees, Tournatractor pushed them 300 ft. for disposal in a field. Push took 2½ minutes; return took about 40 seconds. "Tournatractor did one job fast and was ready immediately for another," comments operator Schwarz. Other assignments included push-loading scrapers, pulling rollers, and handling other important tractor work.

On 40 ft. push, dozes 115 yds. hourly

When trees were removed, Tournatractor dozed in material from 50 ft. on both sides of the road to raise grade 2 ft. and to cut down banks prior to major scraper dirtmoving. Loads averaged 2½ to 3 pay yds. per push. On 80 ft. cycles, push, spread, and return took 1.3 minutes. Big low-pressure tires helped compact material as it was spread on the run.

Travels job-to-job at 19 mph

Crawford County Hwy. Dept. owners, report Tournatractor goes virtually anywhere at speeds to 19 mph. Emergency jobs 5 miles away can be reached in about 20 minutes. As Job Supt. Leonard Hassett summarizes, "One of Tournatractor's advantages is that it can move quickly and efficiently." Let us demonstrate this speed advantage on your job. Write for details.

Tournatractor—Trademark Reg. U.S. Pat. Off. T-823-P-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

WHEN AN OPERATOR TURNS CONTRACTOR HE CHOOSES CAT* EQUIPMENT

That's the way it happened with J. M. Dowd, Jr., of Johnston, S. C. He's been in road building since he was 15 years old. Starting as an operator, he became a grade foreman, then a superintendent. Six years ago he bought a Caterpillar D6 Tractor with a Bulldozer and Scraper. Now he has added another D6 Tractor-Scraper unit and a No. 12 Motor Grader and is doing well with his custom contracting. In his own words, "I've always been a Cat owner. Never use anything else."

You can see the kind of work he does in the photo above. This job, near Blacksburg, S. C., called for moving 32,000 cubic yards of earth on a 1.3-mile road project. Cuts run up to 25 feet deep, and the roadway is 32 feet from ditch to ditch. He completed it in exactly two months.

For a good, clean job of bank-sloping or any other kind of grading, the Cat No. 12 is a hard machine to beat. And the new No. 12 Motor Grader is better than ever. Among other improvements it has the exclusive Caterpillar oil clutch, which reduces wear, can give you 1500 hours without adjustment.

And now tubeless tires are standard equipment at no extra cost. They eliminate an estimated 30% of down time caused by tires. Tubeless tires are easier and quicker to mount, hold air longer, run cooler, and give better puncture and blowout protection.

Your Caterpillar Dealer can show you how to speed production and cut costs with modern, heavy-duty Cat equipment. Depend on him for reliable parts and service, too.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

99% OF ALL CATERPILLAR MOTOR GRADERS ARE STILL AT WORK

. . . for more details circle 186, page 16

Blasted Granite

—TOUGHEST YET

Contractor produces all stone for subbase and base from a single cut on his grading job

BLASTING Boss Milton Iby said that the rock in this cut, on Georgia's freeway north of Atlanta, is the hardest stuff he has ever encountered. And he has blasted rock all over the United States in his 20 years with the Du Pont Company. He is a specialist in blasting in congested areas.

The rock in question is a blue-gray granite streaked with flint. It is in the same formation found in Stone Mountain where Jefferson Davis' likeness is being sculptered out of a cliff. There is a difference though, according to Georgia's state highway engineer, M. L. Shadburn. The Stone Mountain granite, he says, is not as hard as that found in MacDougald's rock job. One can get an idea of the hardness of the rock from the fact that a new Timken rock bit with three sharpenings will drill only 1½ ft. of this stuff.

All crushed rock for the base and subbase is being excavated and crushed from one cut on the project, which comprises 2.5-miles of four-lane limited access expressway on Georgia U.S. 23.

This expressway on the Interstate System is being built to highest standards. Since the project was started, service roads have been added which do not show on the accompanying typical cross-section. As shown by the drawing, the pavement system is composed of 6 in. of compacted selected material on the subgrade of basement soil; compacted soil-mortar-bound crushed rock screenings as a subbase; and 6 in. (about 8 in. loose) of soil-mortar-bound macadam rock.

The alternative to crushing hard granite found on the job was to ship macadam rock and screenings in by rail and then haul from the rail-point to the job.

The pavement is also built in three courses: all courses are of hot-mix concrete, using AC-8 asphalt; 3 in. black base, 2 in. binder course, and 1½ in. wearing course.

● Euclid rear-dumps haul blasted rock to primary crusher-hopper.

● Grading equipment in typical grading procedure. International TD-24 crawlers pulling 15-18 yd. International scrapers.

● *Grading,* Grading except for rock, was handled by crawler-tractor-drawn, cable-controlled scraper units, push-loaded. About 70,000 cu. yd. of material per month was handled. A bulldozer on the fill spread the dump in 6-in. layers, which were compacted by heavy tamping rollers. Specifications required that the soil be compacted only to 95 to 100 percent of standard density, which in this soil, gives a density of 100 lb. per cu. ft. After the tamping rollers had compacted the roadway up to the grading blue tops, a special 25-ton four wheel pneumatic-tired roller made at least two passes over each roadway searching out any weak spots. The use of this heavy rubber-tired roller is standard practice now in Georgia. Testing with this roller is paid for by the state by the mile.

The red clay in this area is not a bad soil and can frequently pass gradation and soil constants requirements for soil-mortar, just as it is found. It generally tests out to less than 15 percent volume change and the P.I. seldom exceeds 10.

One grading procedure practice in Georgia that differs a little from procedure where frost penetration is deep, is the spanning of weak natural ground soils where fills over a few feet in height are involved in new location. Muck and doubtful soils, as elsewhere, are removed.

Where rock in relatively thin seams, not over 18 in. thick, was encountered, it was usually shattered by blasting and loosened with a ripper so the scrapers could handle it. But for thicker seams, power shovels were moved in and hauling was done with large off-highway rear-dumps.

Rock encountered in all cuts, except the one big cut at the northeast end of the project, was hauled into fill. It was allowed to be dumped in 3 ft. layers, mixed with soil, for compaction.

● *Subbase and Base.* The 8-in. soil-mortar-screenings subbase which is to be placed on the compacted selected soil sub-subbase is prepared by first spreading the screenings. On top the screenings, while loose, 25 percent of soil-mortar binder by volume is placed. A rotary mixer thoroughly mixes the two materials with the optimum water content. The mixture is then compacted with heavy tamping rollers to 95 to 100 percent of Proctor maximum. Following is the gradation of the soil mortar:

Passing	*Percent*
No. 10 screen	100

● Caterpillar D397 diesel electric generator trailer unit. Fuel tank feeds engine.

● Wagon drills punching 20-ft. holes in hard granite. Holes spaced about 5 ft.

● Two 600 cfm compressors (Ingersoll-Rand and Worthington) supplied enough air for the drills on this project.

No. 60 screen	15-70
No. 200 screen	5-20
Clay fraction	10-25

P.I. — not more than 9.0
Liquid limit—not more than 25.0

The 6-in. base course which is placed next is a mixture of crushed macadam rock and soil mortar. Gradations for both the screenings and the crushed rock are given in the next section. The base course is controlled to contain not more than 60 percent by weight of the crushed rock retained on the No. 10 screen. At this writing, the subbase and the base course have not been placed. The rotary mixer will be used for the mixing. It is ordinary practice in Georgia to mix each of these two courses in two layers; however, it is believed that the new large-sized rotary mixer will handle the job satisfactorily in one pass for each course. If not, two passes each will be employed.

● *Rock Cut.* It just happened that the big rock cut comprising 175,000 cu. yd., occurred at an intersection of two approach roads of an interchange with the expressway. The cut at this point is 250 ft. to 300 ft. wide. The accompanying profile shows the depth to be around 50 ft. Since the excavation has to be removed down to the sloping grades of the approach roads, plenty of rock is available to complete the job. The contractor can take out all of the rock he wishes, below designed grade lines, if he needs it for crushing, but must backfill with good borrow, at his own expense, to get the designed grades.

Since the grading of the expressway is not complete, the contractor is stockpiling the crushed stone and the screenings. The crushed rock meets the following specifications:

Passing	*Percent*
2-in. screen	100
1½-in. screen	95-100
¾-in. screen	35-70
⅜-in. screen	10-30
No. 4 screen	0-5

The screenings meet these specifications:

Passing	*Percent*
½-in. screen	100
No 10 screen	60-70
No. 200	0-15

● *Drilling and Shooting.* Wagon drills punch the 1⅛-in. holes at 5 ft. spacing to a depth of 20 ft. Ten pounds of 60 percent Du Pont Red Cross gelatin in half-pound sticks is placed in each hole. From 9 to 12 sets of millisecond delays are used in blasting a shot which is limited to 60 lb. per delay per shot. Because of local trouble the contractor would not reveal how many holes were fixed at each shot. About 450 ft. of drilled hole per wagon drill per 8-hour day is obtained. Each drill uses about 12 Carset bits per day, each being sharpened about four times. That's how hard the rock is.

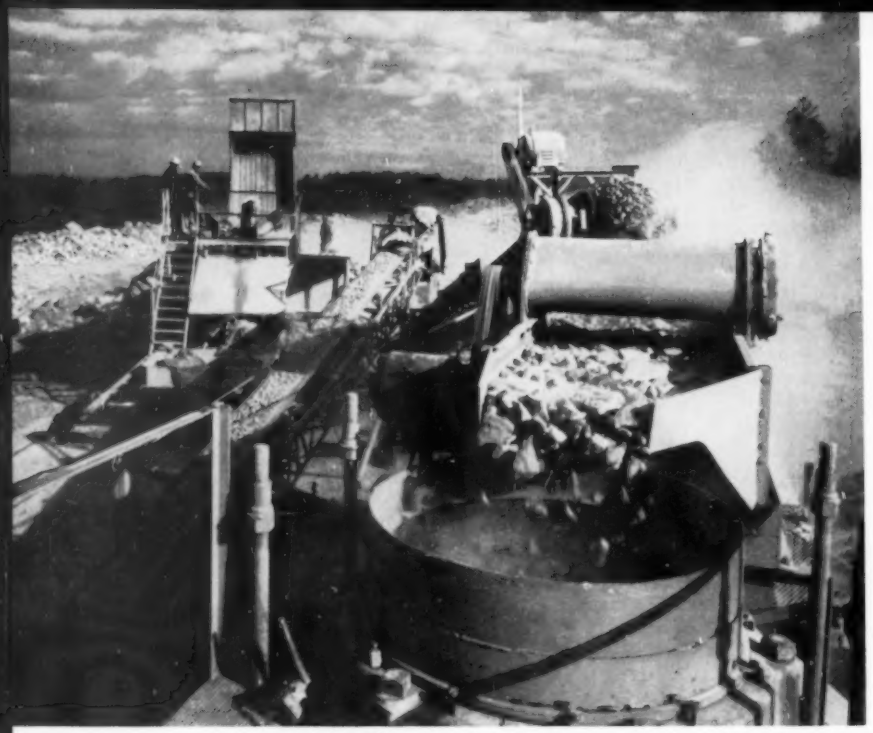
On the grading work, about 50,000 cu. yd. of rock was moved per month from cut to fill. On this work the wagon drills operated in two shifts. 1. The one cut where crushed rock is being produced, the aggregate plant is running about 1,500 ton per 8-hour day. 2. 600 cfm air compressors supply air to the wagon drills for the rock crushing operation; but for the grading operation three were used.

After the rock is blasted, a 2½-yd. shovel loads it into 18 to 20 ton rear-dumps which haul it to the primary crusher hopper. Oversize is being broken up by skull-cracker and crane.

● *Crushing Plant.* The primary crush-

● Converted Army half-track made into greasing and lubricating service rig.

● General view of crushing plant. Twin surge bin is beyond picture at left. Primary unit on right is a 30x42 Pioneer jaw crusher; secondary unit toward left is a Cedarapids cone crusher and vibrating screen unit. Object above belt from primary to secondary is a chute with return belt from cone crusher, depositing crushed material back on original feed belt.



● Another view of the crusher in action.

ing unit is a 30 x 42 jaw. The crushed material falls onto a belt that feeds a screening and cone crusher secondary unit.

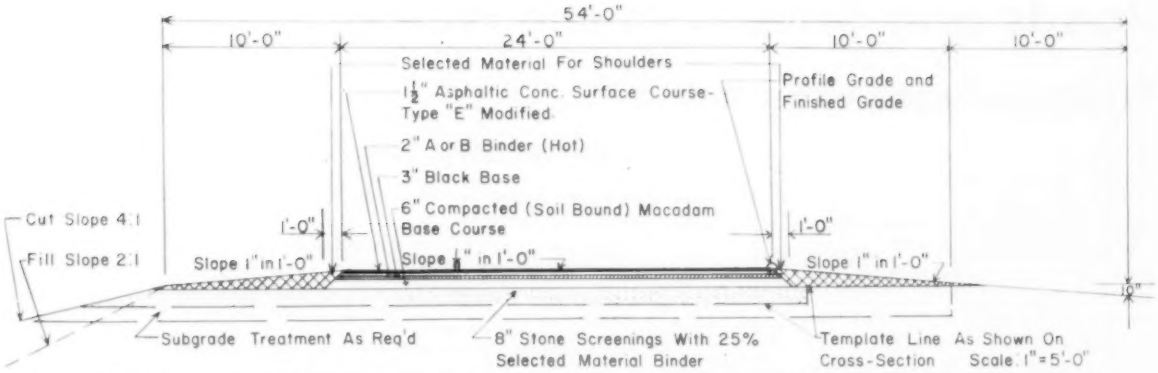
The feed belt from the primary unit drops the material into a hopper that feeds onto large vibrating screens. In this couple are a 1¾-in. screen and a ¾-in. screen. Under half of the ¾-in. screen is a tray that feeds screenings to the screenings surge bin. All material passing over the 1¾-in. screen is fed to the cone crusher, from which the entire output drops onto a belt that replaces all crushed material onto the feed belt from the primary unit to the screens hopper. This recirculation gets any oversize not reduced enough in the first pass and also screens the output from the cone crusher. Material passing the 1¾-in. screen and running off of the ¾-in. screen is dropped into a bin below from which it feeds onto a belt conveyor into one-half of the twin surge bin. Screening is on one side, crushed stone on the other.

A single belt conveyor is installed under the gates of the twin surge bin. When a crushed rock hauling truck pulls up under the conveyor, the bin operator opens that bin until the truck is filled, emptying the belt each truck load; similarly for the screenings hauling trucks.

● *Power Units.* Each unit of equipment is driven by separate electric motor. Power is generated by a large diesel-electric generator set installed in a housed trailer. One end of the trailer is taken up completely by the engine radiator. Another housed trailer contains all of the electric control equipment — transformers, switch gear, fuses, cut-outs, starting mechanisms, voltage regulators. At the end,

● Twin surge bin. Half is for macadam rock, the other for screenings. Single powered belt conveyor feeds either material into trucks.

● Another view of the wide cut from which base stone was produced for paving.



4-Lane Divided Roadway With 6" Compacted (Soil Bound) Macadam Base Course 3" Black Base, 2" A or B Binder (Hot), 1½" Asphaltic Concrete Surface Course Type "E" Modified and 40'-0" Grass Median Strip.

● Typical cross-section of one of dual roadways, showing foundation and surface courses and geometrics of design.

opened during operations, is a board containing red lights, one for each circuit. It is the finest such set-up this writer has ever seen.

● *Equipment.* All equipment is greased and lubricated on a schedule. The contractor converted an old Army half-track into a lubricating service unit. Mounted on it are the various greases in drums, oils, pressure hose lines, air compressor, and a powered small gooseneck crane. The contractor sublet all tire changing and tire repair work.

Following is a list of the principal units of equipment, omitting all bridge construction units:

6 International TD-24 tractors
6 International 18 to 21 cu. yd. cable scrapers
1 Allis-Chalmers HD-20 crawler tractor pusher
1 LeTourneau ripper
1 Caterpillar D7 crawler tractor
3 Tampo heavy tamping rollers
2 Caterpillar 12 motor graders
1 Caterpillar D8 tractor with bulldozer
1 Special 25-ton 4-wheel rubber-tired roller
1 Seaman-Andwall large Pulvi-Mixer
4 Northwest 80D, 2½-yd. shovels
1 Northwest 25 backhoe
1 Northwest 25 crane with ¾-yd. clamshell bucket
5 Ingersoll-Rand wagon drills.
2 Ingersoll-Rand rock drills (jackhammers)
1 Worthington 600 cfm air compressor
1 Chicago Pneumatic 600 cfm air compressor
14 Euclid 18-20 ton rock body, rear-dump trucks
5 Chevrolet 2½-ton dump trucks
4 Ford pick-up trucks
1 Platform scale
1 Hobart welder
1 Army half-track grease rig
1 Automobile
1 Caterpillar D397 closed - trailer - mounted, diesel-electric generator
1 Closed-body electric control trailer
1 Pioneer primary 30x42 jaw crusher unit with power belt to feed secondary unit
1 Pioneer primary 30x42 jaw crusher unit powered belt to feed secondary unit
1 Cedarapids secondary cone crushing and screening unit with return feed belt and belts to feed surge bins.
1 Pioneer surge bin to load trucks
1 Twin surge bin
1 International rubber - tired tractor with twin sheepsfoot roller, Miscellaneous hand tools, hose, wire rope, pumps, jacks, cables, fuel tanks, etc.
1 Complete repair shop in Atlanta

● *Bid Prices.* In Georgia, all grading is let as unclassified excavation, at a single price per cu. yd. The contractor must move rock, soil, muck or whatever material is encountered at this one price.

Bid items for the foregoing job were:

Unclassified excavation	$0.41
Selected soil sub-subbase	$0.35
Subbase	$2.20 per ton of screenings and 0.35 per cu. yd. of soil mortar.
Base	$2.92 per ton of crushed rock and 0.35 per cu. yd. of soil mortar.
Bituminous black base	$4.21 per ton of mix
Bituminous binder course	$4.22 per ton of mix
Bituminous wearing course	$4.16 per ton of mix

In addition, asphalt AC-8 is paid as a separate item at $0.112 per gal.

● *Personnel.* The prime contractor is the MacDougald Construction Company, Atlanta, Ga. Rock crushing was sublet to Stockbridge Stone Company, Stockbridge, Ga. Tire changing and repair were sublet to the Bradford Tire Company, Atlanta.

The contractor's superintendent is Sam C. Inman; the powder man is Milton Iby. For the Georgia State Highway Department, M. L. Shadburn is the chief engineer; S. P. Allison is the urban engineer; and Grady P. Holcomb, the project engineer.

Editor Wanted

for Highway Engineering and Construction Magazine

Career opportunity open for civil engineer with practical highway or construction experience and a proven aptitude for writing. Job will entail nation-wide travel part of time with camera and notebook, on staff of growing group of technical publications.

Please give resume of education, experience, personal details, salary required. Reply will be held confidential.

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Roads and Streets
Gillette Publishing Company
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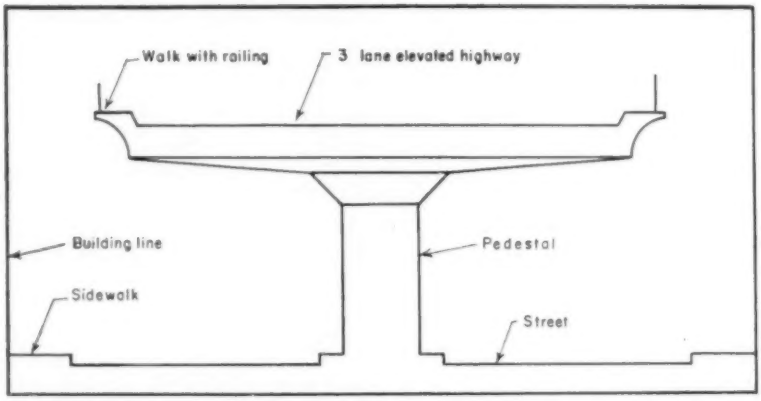
Chicago 10, Illinois

Roads and Streets in the News

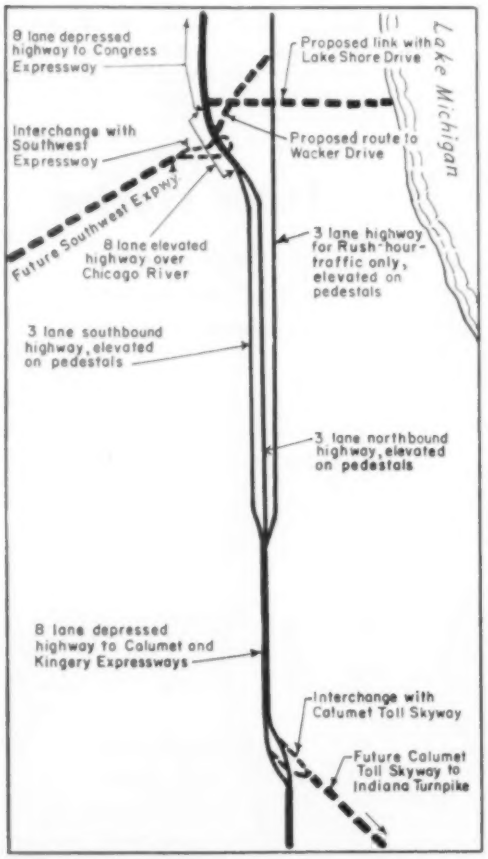
Triple elevated expressway proposed for Chicago

A NEW twist in expressway design was under consideration as part of Chicago's metropolitan program as the 1955 year ended. As sketched on the accompanying map, it would consist of a 3-lane elevated highway, extending along each of three parallel streets about one block apart, forming a 9-lane elevated system on Chicago's South side. Six lanes would be available in the combined system for rush hour traffic toward the downtown district in the morning, and outward in the evening by reversing lanes.

The highway would tie in with the Calumet Toll Skyway, an elevated link which will connect eventually with the Indiana Toll Road, going around the lake toward the east. On the north, the system would connect by means of a conventional 8-lane depressed highway, leading to the westside Congress Expressway and skirting the downtown "Loop" district. The triple-elevated road was proposed by Wm. J. Mortimer, Cook County Highway Superintendent.



● Pedestal-type piers would minimize interference with traffic along the Street below.


8 lane depressed highway to Congress Expressway
Proposed link with Lake Shore Drive
Lake Michigan
Interchange with Southwest Expressway
Proposed route to Wacker Drive
Future Southwest Expwy
8 lane elevated highway over Chicago River
3 lane highway for Rush-hour traffic only, elevated on pedestals
3 lane southbound highway, elevated on pedestals
3 lane northbound highway, elevated on pedestals
8 lane depressed highway to Calumet and Kingery Expressways
Interchange with Calumet Toll Skyway
Future Calumet Toll Skyway to Indiana Turnpike

● Three-ply elevated expressway proposed for Chicago's South side.

The elevated design, consisting of pedestal-type piers and cantilevered deck, is estimated to cost only $6 million per mile, compared with $8 million for depressed roads such as Congress Expressway which has been carved out of Chicago's heavy blue clay.

The elevated design would cut construction time by about three years, and reduce the amount of land required, since existing streets would be used rather than requiring a full block - wide swath of building demolition, such as other expressways in the Chicago area have required to date. The old surface - level street area between piers would be used for parking, according to the advocates of the project, which would be financed mainly through a $245 million bond issue authorized by the 1955 Illinois Legislature.

Kansas Turnpike opening set for late 1956

With most of the grading done, the 236-mile Kansas Turnpike was 25% complete, according to a report made to Gale Moss, general manager of the turnpike authority.

Contracts in force as of November 1 totalled $97,515,000. Due to be awarded at the year-end, were miscellaneous items including 2.3 miles of permanent right-of-way fencing inside of Kansas City, Kansas; roadway signs and markings; lighting systems for interchanges; service and maintenance areas; a communications system, toll plazas, maintenance areas and administration building.

All of the 253 bridges for the turnpike are under contract with construction started on most of them. A major problem confronting the contractors is the relocation or line change of more than 700 utility installations which crossed the right-of-way, totaling $2,000,000 in work.

The first concrete paving on the eastern end was started in October, and base course work begun on the asphalt sections at the west end. The big paving push will occur in 1956.

The turnpike agency notes that of the 72 contractors at work on the turnpike, 31 are from Kansas, handling 47% of the dollar volume of awards. Other contractors have come in from 13 states.

Howard, Needles, Tammen & Bergendorf are the general consultants for the Kansas Turnpike, with Joseph Sorkin, project engineer.

Ohio's annual report reflects enlarged program

One of the most attractive annual reports issued this year by a state highway department has been produced by Ohio.

The 74-page, two-color publication put together by the Bureau of Public Information, describes clearly what the highway organization accomplished in 1954. The breakdown, by bureaus and divisions, enables readers to grasp, not only the total picture of accomplishment, but progress within divisions. It is attractively illustrated.

A heavy return of editorial clippings indicated that Ohio editors found much in the publication to publicize.

Highlights from the report were:

- 273 projects, worth $108 million were put under contract.
- 19 agreements were made with consulting engineers for survey and plan preparation work on 250 miles of rural roads.
- Under a strong recruiting program, twice as many engineering graduates were inducted as in 1953.
- Sufficiency ratings were computed for 12,000 miles of rural state roads, 227 underpasses and 8,633 bridges.
- Plans were prepared for $150 million worth of urban work to be let in future.

Thruway bonds sell at 2.739% interest rate

Another $50,000,000 in bonds was sold during December by the New York Thruway Authority, following a similar bond sale in October. The state-guaranteed bonds were sold to a banking syndicate at 2.739% interest rate. While the highest yet paid in the billion dollar financing program for the Thruway, this rate is still lower than rates paid recently in other states for bonds not secured by state credit.

This latest transaction brings permanent financing of the Thruway to $700,000,000 of which $350,000,000 has been borrowed on state-guaranteed bonds at interests ranging from 2.5146% to 2.739%.

New segment of Chicago's Congress Expressway opens

Chicago's urban expressway program crystallized one step further recently with the opening of a 4½-mile segment of Congress Street Expressway. This is the multi-million dollar depressed highway which will connect Chicago's downtown "Loop" with the West Side and the western suburbs.

Other sections have already been opened, the link leading directly into the "Loop" is expected to be completed in 1956, and extensions westward into the suburbs in the three years following. Congress Street Expressway is unique in that it has rail transit facilities along the median.

Court decision upholds Michigan Turnpike project

The final legal barrier to the north-south turnpike in Michigan known as the Rockwood-Saginaw Turnpike was removed recently when the state supreme court affirmed a circuit court opinion upholding the right of the Michigan Turnpike Authority to construct the highway.

The authority planned to proceed at once on financing. The new green light includes the right to determine routes, and to acquire right-of-way land.

Problems discussed at MRBA meeting

The recent meeting of the Michigan Road Builders Association in Detroit was of wide interest because the subjects covered cooperatively with the state highway department.

Specifications for state highway work were combed over with attention to many minor points spotlighting the need to capitalize on recent experience in the field or to utilize latest construction techniques and materials.

The formation of joint ventures by contractors was discussed. Such group action by contractors was seen to be useful in connection with large projects expected in the period ahead. Discussion pointed out the need for giving ample time for the formation of such ventures while keeping enough time for the highway department to check the bidder qualifications.

Another problem reviewed was the matter of pay for increased or decreased quantities. State engineers pointed out that proposed changes in payment for such quantities do not alter negotiations due to changed conditions but refer only to larger or smaller payments for work items. Further committee meetings are planned on this matter.

Progress in safety among contractors was reviewed by the association's executive secretary C. J. Carroll who said that probably more safety training courses will be held in 1956 at Michigan State University, based on the success of such courses given in the past year.

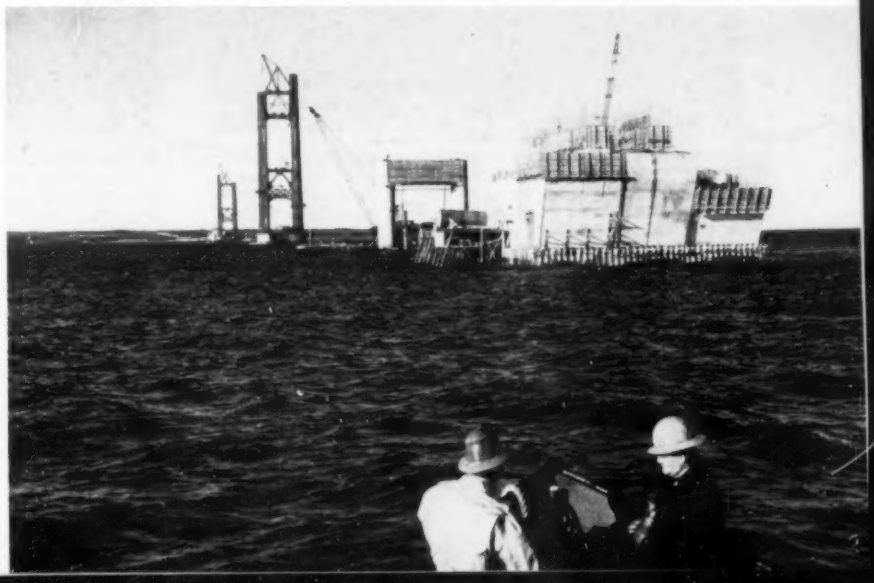
Maine Turnpike extension opened to traffic

The 58-mile extension to the Maine Turnpike, taking this highway northward as far as Augusta, was opened to traffic in December. This brings to 106 miles the length of this turnpike built at a total cost of $75 million.

Maine and New England motorists and truckers, having a taste of the speed and safety afforded by a divided 4-lane highway with fully controlled access, are already clamoring for another extension that would take the turnpike up the State toward the northern border.

Meanwhile traffic for 1956 on the entire road is forecast at 5,162,000 vehicles, and revenue from tolls and concessions for the coming year is forecast at $4,815,000.

● Showing completed substructure and steel erection on the Mackinac Bridge now in progress by U. S. Steel, American Bridge Division.



CAT* DW21 – NO. 470

LOWBOWL

SCRAPER

OUTLOADS COMPETITION IN ON-THE-JOB TESTS ON KANSAS TURNPIKE

1. TESTS WERE MADE on contractors' jobs on the Kansas Turnpike. They covered a period of three weeks. For each comparison, the competing units were loaded under similar conditions. Soil density tests were performed right in the loading area to provide an accurate measure of scraper load in pay yards.

2. FIELD ENGINEERS weighed load after load as the competing units passed over a portable platform scale. By subtracting average empty weight from average gross weight, they determined average net load weight. In every test, the No. 470 Scraper with exclusive Caterpillar Lowbowl design consistently carried larger payloads.

3. JOB STUDIES showed that the new turbocharged 300 HP DW21 Tractor had the "go" to equal or beat other units in cycle time while carrying more pay yards. Other features contributing to this unit's success were large 29.5-29 tires, an efficient power train, synchro-safe brakes and the fast, responsive No. 27 Cable Control.

4. LOWBOWL DESIGN, developed by Caterpillar, is a feature of the No. 470 Scraper. With this new concept, the bowl has been widened and lengthened, yet its depth has been decreased. But Lowbowl design is more than just dimensional changes. As the tests show, material is loaded with less resistance clear out to the end of the loading cycle.

TEST RESULTS

No. 470 Lowbowl Scraper (18 cu. yd. struck capacity) vs Competition

No. 470

AVERAGE LOAD

18.1

BANK CU. YD.

Scraper A

18 cu. yd. struck capacity

AVERAGE LOAD

14.8

BANK CU. YD.

LOWBOWL ADVANTAGE:

3.3 bank cu. yd. per load

Test conditions: Damp silty clay—density: 3300 pounds/cu. yd. **Weight Comparisons:** Average net load, pounds: No. 470—59,840; Scraper A — 48,675.

Comments: On one load, the operator of Scraper A was asked to obtain maximum heap. It took 2.40 minutes of push loading to pick up a load which weighed 58,875 net pounds — less than the average load carried by the No. 470!

No. 470

AVERAGE LOAD

18.1

BANK CU. YD.

Scraper B

Sideboarded — 18 cu. yd. struck capacity

AVERAGE LOAD

14.3

BANK CU. YD.

LOWBOWL ADVANTAGE:

3.8 bank cu. yd. per load

Test conditions: Sandy clay. Density: 3100 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470 — 56,225; Scraper B — 44,400.

Comments: Average loading time for both machines was comparable. In total cycle time, the DW21 had the advantage. Its transmission provided a better match to rimpull requirements, and its shorter turns saved time on the fill.

No. 470

AVERAGE LOAD

18.1

BANK CU. YD.

Scraper C

18 cu. yd. struck capacity

AVERAGE LOAD

14.3

BANK CU. YD.

LOWBOWL ADVANTAGE:

3.8 bank cu. yd. per load

Test conditions: Damp silty clay. Density: 3300 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470 — 59,840; Scraper C — 47,290.

Comments: Scraper C, like Scraper A and the No. 470, has a rated capacity of 18 cu. yd. struck. On the job, where results, not rated capacities, are the true yardstick of a machine's ability, the No. 470 Scraper with Lowbowl design decisively outloaded the other two.

No. 470

AVERAGE LOAD

15.6

BANK CU. YD.

Scraper D

Sideboarded — 18 cu. yd. struck capacity

AVERAGE LOAD

13.3

BANK CU. YD.

LOWBOWL ADVANTAGE:

2.3 bank cu. yd. per load

Test conditions: Heavy clay. Swell about 40%. Density: 3440 pounds/cu. yd. **Weight comparisons:** Average net load, pounds: No. 470 — 53,550; Scraper D — 45,630.

Comments: In the tests, Scraper D scored next best to the No. 470. *Scraper D is the "old" DW21-No. 21,* a unit that set records for high production at low cost the world over. Now, in the new DW21-No. 470, Caterpillar has produced a unit that's even better—and way ahead of competition!

Results on the job, not rated capacities, are the only true measure of a machine's ability to produce. Check the results here and judge for yourself how much the *extra yards* moved by the DW21-No. 470 Lowbowl Scraper can mean *profit-wise* to you!

Your Caterpillar Dealer has a complete report of this on-the-job test on the Kansas Turnpike—as well as similar reports from other sections of the country. Ask him to show you the advantages of Lowbowl Scrapers on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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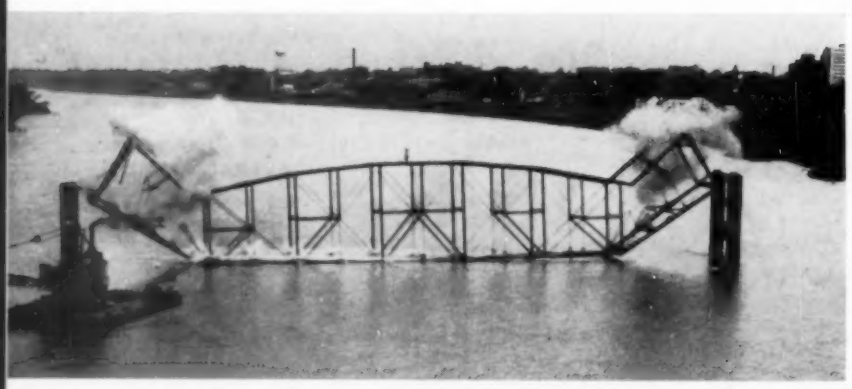
BIGGER, FASTER LOADS WITH LOWBOWL SCRAPERS

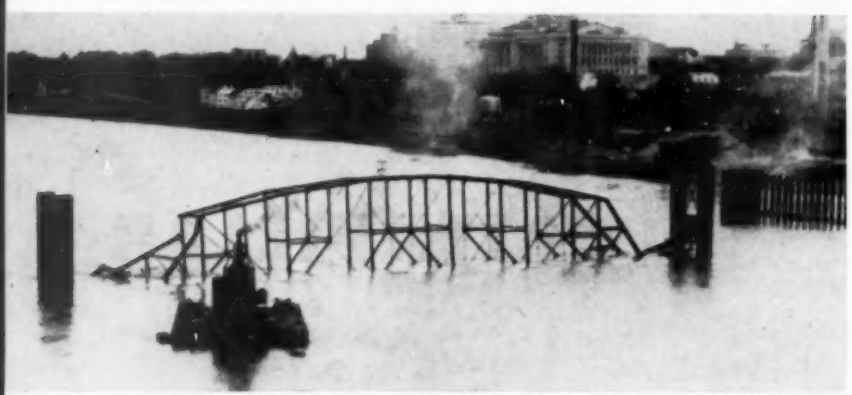
. . . for more details circle 185, page 16

Dynamite Helped Salvage Old Spans

HOW the skill and judgment of an experienced blasting crew can aid in a bridge demolition job, was demonstrated recently at Jefferson City, Missouri. An old highway bridge spanning the Missouri at this city was removed under a contract held by Kansas City Bridge Co., of Kansas City, Mo.

The Missouri state highway commission awarded the removal job in April, 1955, at $163,000 plus salvage of old steel. Work however was delayed until the new replacement bridge could be opened to traffic. Finally, on August 22, the contractor got notice to proceed, with 180 days in which to complete the removal.

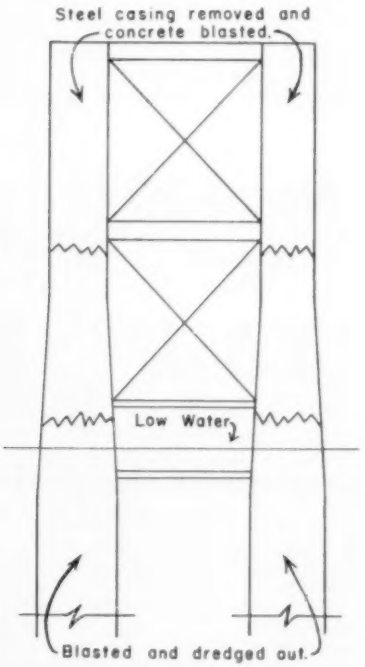




The bridge consisted of two 51-ft. plate girders, two 220-ft. swing spans, two 350-ft. truss spans and eighteen 23-ft. timber spans. The river piers were steel tubes filled with concrete. The contract required that piers be removed to 18 ft. below standard low water elevation.

The swing span was easily removed without falsework, removal simply started at each end and worked toward the pier.

For dropping each of the 350-ft. truss spans into the river, sixteen sticks Gelex No. 1 dynamite, set off electrically by BB caps. The charges were of four sticks each. Charges were placed at the 'M-2' points of each span; i.e., the midpoint of the vertical connecting the second floor beam from the end of the span to the top chord. On these pin-connected spans was a diagonal running from the hip



● How the piers were taken down with successive blasts.

● Split-second camera timing! One of the 350-foot truss spans shown at the instant of the dynamite blast; a moment later when it hit the water; and after coming to rest in the shallow water. This technique afforded maximum salvage values for the truss members. (United Press Photos, top and bottom).

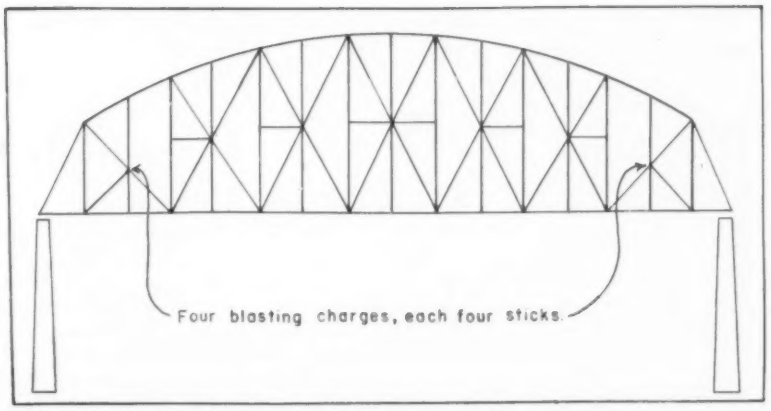
point 'U-1' to bottom chords point 'L-3'. Where this diagonal crossed the 'U-2' - 'L-2' vertical, these members were connected by a pin, and it was at this point that the dynamite was placed to do its work. Previous to placement of the dynamite, the hood plates and the side pin plates at hip points 'U-1' were burned in order to make the collapse of the span more positive.

The water in the river, at the time this work was done, was only about 5 ft. deep. The spans landed upright and all of the steel above the waterline was first removed by burning. A floating crane was then used to raise sections of the span under water into position for torching. This process was repeated until all of the steel had been removed.

The entire floor system had been removed before the span was dynamited, as can be seen from the pictures of span No. 2.

The piers were also removed with the help of explosives, the debris being taken from river by dredging.

Harry S. Pyle, superintendent for the Kansas City Bridge Company, was assisted in the shooting by F. Martin Trantham, demolition expert from the firm's Kansas City division. The work was done under District 5 of the highway commission. Foregoing data courtesy J. J. Corbett, construction engineer of the commission, and E. L. Zimmer, office engineer with Kansas City Bridge Company.



● Showing location of the dynamite charges for the 350-ft. spans.

Meetings Ahead

THE ASSOCIATION OF ASPHALT PAVING TECHNOLOGISTS — annual meeting, Hotel Cleveland, Ohio; February 13-15, 1956.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA — Annual Convention, Waldorf-Astoria Hotel, New York, N. Y.; February 13-16, 1956.

NATIONAL READY MIX CONCRETE ASSOCIATION — Annual Convention, Conrad Hilton Hotel, Chicago, Ill., February 13-16, 1956.

NATIONAL SAND AND GRAVEL ASSOCIATION — Annual Convention, Conrad Hilton Hotel, Chicago, Ill.; February 13-16, 1956.

AMERICAN SOCIETY OF CIVIL ENGINEERS — Winter Meeting, Baker Hotel, Dallas, Texas; Feb. 13-17.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS — annual meeting, Mayflower Hotel, Washington, D.C., Feb. 17-18.

NATIONAL BITUMINOUS CONCRETE ASSOCIATION — national convention, Conrad Hilton Hotel, Chicago, Ill.; Feb. 17-18.

NATIONAL CRUSHED STONE ASSOCIATION — Annual Convention, Conrad Hilton Hotel, Chicago, Ill.; February 20-22, 1956.

AMERICAN CONCRETE INSTITUTE — 52nd annual convention, Bellevue-Stratford Hotel, Philadelphia, Pa.; Feb. 20-23.

ILLINOIS HIGHWAY ENGINEERING CONFERENCE, University of Illinois, Urbana, Ill; February 28, 29 and March 1, 1956.

ASSOCIATION OF HIGHWAY OFFICIALS OF NORTH ATLANTIC STATES — 31st annual meeting, Hotel Statler, Boston, Mass., Feb. 29. - March 1.

ILLINOIS TRAFFIC ENGINEERING CONFERENCE, University of Illinois, Urbana, Ill.; March 1-2, 1956.

AMERICAN CONGRESS OF SURVEYING AND MAPPING — annual meeting, Shoreham hotel, Washington, D.C,; March 18-24.

PURDUE UNIVERSITY — 42nd Annual Road School, Lafayette, Ind.; April 2-5.

ACI Philadelphia meeting

The American Concrete Institute's 52nd annual convention (Feb. 20-23, Bellevue-Stratford Hotel, Philadelphia) is expected to be a record breaker. The first day will be technical committee meetings; the remaining three days, general sessions. Sessions will be held on new ACI Standards and committee reports, the ACI Building Code, prestressed concrete, shrinkage in concrete, concrete construction and design, and the annual research session.

Karl P. Billner, president, Vacuum Concrete, Inc., Philadelphia, is general chairman.

ASCE winter meeting to draw road men

The national winter convention of the American Society of Civil Engineers will be held in Dallas, February 13-17 in the Baker Hotel. Attendance is expected to exceed 1,400. Some 80 technical papers will be presented. Meetings are scheduled for the Highway, Air Transport, Hydraulics, Structural, Waterways, Power, Sanitary Engineering, Surveying and Mapping, Soil Mechanics and Foundations, Irrigation and Drainage, and Engineering Mechanics divisions. There will also be meetings of the Pipeline Committee of the Construction Division and the Department of Conditions of Practice.

Electronic Toll Collection

An IBM toll collection system, placed in operation on the Pennsylvania Turnpike System at year end, utilizes the latest equipment of its type available and is based on an entirely new principle of dynamic weight classification.

Under the new system, vehicles using the Turnpike will be automatically classified according to their gross weight, with fares established for each classification. This classification will be accomplished instantaneously by means of electronic weighing, axle-counting and axle-grouping equipment installed in Turnpike entrance and exit lanes. The Commission described it as the most equitable method of determining fares yet devised and said that it provides certain benefits in cases where equipment and weight variations are a factor.

● Trucks and buses in their operation or manufacture provide jobs for 6,725,000 Americans or one in every ten employed persons in the nation.

Controlling compaction by use of "compaction ratio"

By Charles W. Baxter. 29th Annual Highway Short Course, Texas Highways, pp. 59-61, May, 1955. Highway Research Abstracts, September, 1955.

In 1933, R. B. Proctor's article in the Enginering News-Record and the control of compaction in earth-dam construction did much to encourage thinking and work along the lines of designing roadways as engineering structures. Advancement has been made at a rapid pace ever since. Today, the Texas Highway Department has advanced still farther by the development of the compaction ratio. This compaction ratio is used for the control of density in subgrades, subbases, and bases. Compaction ratio expresses the degree to which it is desirable to compact soil materials on the basis of the compactibility of the material. This method seems more practical than the usual method of specifying an arbitrary percentage of some maximum density.

Before setting up compaction ratio as a contract item, a job was selected to try it out on and iron out the difficulties that always arise with a new procedure. Samples were taken of each soil type to be encountered and moisture-density curves were run. Various kinds of rolling were tried to secure the best density. Field density tests were run on each lift, and the results were gratifying. It was about the best subgrade ever obtained. The heavy pneumatic roller gave the best results, especially on the foundation course and flexible base.

With the success of this project it was decided to put compaction ratio in the specifications. A few variations were made due to the experience gained on the trial project. Instead of running moisture density curves by the compaction-ratio method on each soil type, a special specification "Preparation of Subgrade" was written. After the subgrade had been brought to line and grade the top 8 in. was scarified and recompacted. It was on this top 8 in. that the moisture-density curves were run and the density measured in place.

By this method it was easier to get the samples for running the moisture-density curves and be surer of comparing with the proper curve when in-place-density samples were taken. Compaction was paid for by the square yard. It was felt that to get compaction on the top 8 in. the contractor would have to bring his embankment up with proper density, if not, it would compare to trying to compact a material on a sponge.

Editorial

Briefly Noted . . .

The road building fraternity will miss Tom Keefe who died recently in Washington. He was one of those "fabulous" fellows who counted among his friends many congressmen and other leaders in the Washington scene.

In serving the American Road Builders' Association, he did much to help foster understanding of the complex problems of highway development. In eulogizing Mr. Keefe, an ARBA spokesman noted that his all-too-rare formula for winning friends was expressed in his personal philosophy: "Serve others, without hope or desire of personal reward."

•

If the New England road people finally decide that a permanent change in hurricane patterns has taken place, they could make no better decision than that advocated recently by a federal civil defense official. That is to stockpile a large number of prefabricated bridges for use in flood emergencies. Bailey bridges have been worth their weight in gold, following the recent floods.

•

Since Congress began deliberations last session on a Federal highway program — which ended in a stalemate — the road needs have climbed steadily, notes the National Highway Users Conference.

Our population has increased 2.8 million.

Motor vehicle registrations have increased 2.7 million.

Traffic on the highways has increased 5.5 percent.

Inadequate roads have cost the motoring public an estimated $5.3 billion in accidents, loss of time and operation costs. This cost rises almost $200 million a year as traffic increases.

Almost one-half of the total cost of road inadequacies — $2.6 billion — is due to inadequacy of the Interstate System.

Last year 36,000 people lost their lives in traffic accidents. A million and a quarter people were injured, of whom more than 100,000 suffered permanent disabilities.

It has been estimated that modernization of the Interstate System, alone, would save one life annually for each ten miles of the System. Thus some 4,000 lives could be saved every year if these 40,000 miles of important roads were brought up to present day standards.

•

The indecision of Congress also has led the states and cities to defer planning and programming of local highway improvements.

A survey by the American Municipal Association shows that in 85 cities representing 38 states and the District of Columbia, 129 projects, which would total an estimated $5.5 billion, are or will be adversely affected because an expanded Federal highway program was not enacted last session.

The statement from Mayor Joseph E. Dillon of St. Paul, Minn., is typical of ones being made by public officials all over the country. Mayor Dillon says, ". . . it is essential that additional federal funds be made available at once so that . . . projects may be planned and rights-of-way acquired in advance of construction so as to forestall skyrocketing costs once routes are established. The longer action on new federal legislation, with higher percentages of federal aid, is delayed the more impossible will be the problem of meeting traffic needs within a reasonable time."

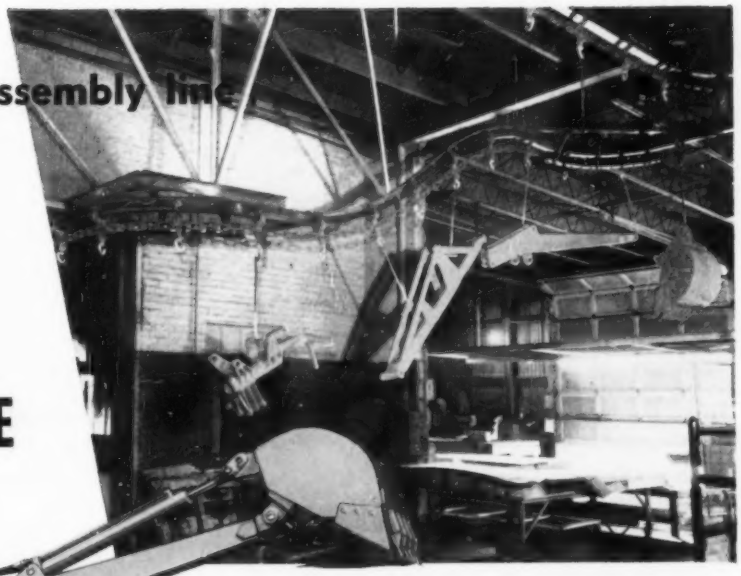
•

How to meet the material shortages is again a problem these days. This is especially true in regard to structural shapes for the hundreds of new bridges and overpass structures in the design stage today, some of the designs may have to be modified to get the jobs done on schedule in 1956.

Those who designed bridges during the war years still recall the things that can be done with built-up structural members, using plates and available shapes, to take the place of I-beams and rolled girder shapes.

Right off the assembly line

THE *NEW* DAVIS BACK-HOE



BETTER 9 WAYS

This new quality-built Davis Back-hoe is an outstanding performer on jobs normally expected of a back-hoe. But, because of the following features, it does jobs that the ordinary back-hoe couldn't tackle... provides for unequalled operator comfort and vision... and it sells for a price that's far less than the average back-hoe.

1. It digs at right angles to either side of the tractor... to the rear... or at any spot in between.
2. Operator revolves with boom... always faces work without twisting.
3. Comfortable, well-padded seat with foot rest lessens operator's fatigue.
4. Digs 13 feet deep... dumps all the spoils to just one side, if desired.
5. Operator can always see where he is digging... even at maximum depth.
6. Can be detached or attached in less than five minutes... without sacrifice to rigidity.
7. Won't upset because extra wide frame has two individually controlled hydraulic stabilizers.
8. Full-floating pins used throughout. Lifetime sealed ball bearings used in king post.
9. Mass produced on assembly line basis for exceptionally low cost.

MAKES A THOROUGHBRED COMBINATION WITH THE

DAVIS LOADER

The Davis Back-hoe is sold in combination with America's quality front-end tractor loader... the loader that is designed to make you more money because it provides for faster, smoother, more efficient action. Get complete details on the simplified attachment of the Davis Back-hoe to the Davis Loader, and find out why you pay less than you would expect for this equipment.

Sold and Serviced Nationwide by Better Dealers

SEND FOR FREE LITERATURE AND NAME OF DEALER

Please send me literature on the Davis Back-hoe.... and Davis Loader.... to fit a.....tractor.

NAME.....

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MID-WESTERN INDUSTRIES, INC.

1009 S. WEST ST. DEPT. R WICHITA, KANSAS

. . . for more details circle 257, page 16

Utilities pipeline contractor

Averages 20 feet of trench per minute, digs 2 to 4 jobs per day with each of his Clevelands

1000 feet of complete pipeline construction—trench digging, pipelaying, backfilling and backfill compaction—is an average day's work for each crew of F. H. Linneman, Inc., pipeline and utilities contractor of Denver. Most of this work is on 2-, 4- and 6-inch pipelines for the many new housing developments in the Denver area.

With a Cleveland Trencher opening up trench at an average rate of 20 feet per minute, a typical Linneman crew will do 2, 3 or 4 complete pipeline jobs in an 8-hour day—jobs that run from 50 to 1000 feet each in length. One of these crews has a record day's production of 7 complete jobs.

Currently operating 7 Cleveland Trenchers, Linneman specializes in utilities work—gas, water and sewer line construction. Equipment-minded and especially maintenance-conscious, he has consistently employed Clevelands ever since he began his contracting business in 1946.

Fast portability of equipment is essential in Linneman's tight-scheduled operations. His Clevelands can be loaded on their low-bed trailers in less than 10 minutes time, ready to roll safely from job to job at legal limit speeds.

"Maintenance costs on Clevelands are appreciably lower" says owner of 7

Here is what F. H. Linneman has to say about trenchers:

"In the type of work we most generally perform, in the city especially, we have found Clevelands best suited to our operations because of their narrow-width construction, compactness and speed. They enable us to work in close places and keep trenching ahead of follow-up operations, a decided advantage.

"We have employed Clevelands in our work since we began contracting in 1946. We have seven of them at the present time, the oldest being a Cleveland Model 95 purchased in 1948. We have no record of the miles this machine has dug, but feel that it would be a near-record. Our maintenance costs on it have been extremely low.

"Our over-all maintenance costs on Clevelands are appreciably lower than on other trenchers we have operated. This is another reason why we have purchased more Clevelands than any other make. We have also found it easier to train operators for Clevelands than for any other make. Our newest Cleveland, a "240," was delivered only last week by H. W. Moore Equipment Co., here in Denver."

THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave. Cleveland 17, Ohio

CLEVELAND

. . . for more details circle 190, page 16

Lt. Gen. Eugene Reybold

Maj. Gen. Louis W. Prentiss

John N. Robertson
re-elected ARBA president

Road Builders Map Long-Range Job

Delegates at ARBA's Miami convention hear latest congressional thinking on road program. Technical sessions marked by outstanding papers and discussions on varied problems

ON THE EVE of hoped-for Congressional action on an expanded federal highway program, the American Road Builders' Association furnished a timely sounding board of utterances on this $100 billion dollar question. At the ARBA's 54th annual convention, held at Miami Beach, January 11-14, Washington leaders revealed diverse and sharp thinking, all however speaking optimistically of prospects for a stepped-up highway effort.

Despite the convention's off-center location, the attendance was heavy — once again demonstrating ARBA's unique function of bringing highway engineers and officials from all government levels together with contractors, educators, manufacturers, material suppliers and others concerned with the Highway Problem.

● *Fallon's Plan.* Congressman George Fallon, chairman of the House Subcommittee on Roads, announced his sponsorship of a $34 billion scheme, of which $10 billion would go into the regular federal-aid system and $24 billion into the proposed National Interstate System, over a 12-year period.

Under the Fallon plan, which is expected to draw Democratic support, funds for the regular federal-aid systems would start at $750 million in 1957 and be increased $25 million each year until they had reached $1 billion in the 12th year.

Congressman Fallon suggested that financing of the $24 billion for the National Interstate System be left to the House Ways and Means Committee.

"We've got to start on *this* program this year," he said. "We must have adequate roads if we are going to avoid economic stagnation."

He noted that it is "all important" to draft a long-range program stable enough to permit wise equipment purchasing and materials production.

Increased highway user taxes to finance a $37 billion road program were proposed by Congressman John J. Dempsey. The New Mexico representative asked for a one-cent boost in both the federal gasoline and diesel tax, a 3½ cent per pound increase in the tax on tire rubber (regardless of size), and an increase in the excise tax on trucks and truck-trailers from 8% to 10%. He also would put $24 billion into the Interstate System and $13¾ billion on regular federal-aid systems.

● *Senator Francis Case,* ranking minority member of the Senate Subcommittee on Roads, suggested levying a federal stamp tax on vehicles to help finance construction of the National Interstate System. Starting at $6 per automobile and ranging upward for trucks, the tax would yield between $400 million and $500 million annually.

The South Dakota senator pointed out that in the midst of demands on every hand for more federal aid, 15 states still have not programmed all the money apportioned to them for 1956, to say nothing of 1957 funds also apportioned. Only five states have had plans approved by the Bureau of Public Roads for projects out of 1957 funds. Three states — Connecticut, West Virginia, and Maryland — are farthest behind, each with less than 3% of 1957 federal aid programmed.

ARBA for "Balanced" Highway Program

Chief resolution to come out of the Miami convention was one which reiterated much of the thinking formalized at the Association's County and Local Road Conference at Gatlinburg, Tennessee last fall:

1. Hang on to the long-established federal financing policy which provides state matching funds, with the states doing the job.

2. Aim to bring the highway system up to par preferably within 10 years.

3. Assist the states on a well-balanced basis — "the orderly, proportionate and, so far as practicable, concurrent improvement of the Federal-aid interstate, primary, and secondary systems, including the designated urban highways."

4. Push through the Interstate system job, so important to defense and national economy, on a 90% federal basis.

5. Keep the 50-50 basis for the other systems.

6. Leave to each state the matter of employment practices, wage scales, and working conditions — for the reasons that federal straight-jacketing might boost administrative costs, abridge collective bargaining rights, encroach on states' rights generally, and contribute to higher construction costs.

7. Keep federal highway aid administration under the Bureau of Public Roads.

There will be plenty of credit for equipment purchasing, Congressman Jesse P. Wolcott, ranking minority member of the House Banking and Currency Committee, told the road builders. Mr. Wolcott indicated that some bond financing for federal aid is not out of the picture.

● *Separate Programs.* Also advocating additional highway user taxes was Congressman Harry J. McGregor, who authored the 1954 Highway Act. He asked for continuation of the regular federal-aid program separate from any new long-range plan for construction of the Interstate System. Mr. McGregor would increase authorizations for the regular federal aid systems from $700 million to $800 million and allow another $175 million for the Interstate network.

Senator Dennis Chavez (D., N. Mex.) told the contractors and highway officials that an up-to-date road system is a "desperate need," and there is no place for political bickering in the federal highway program.

● *ARBA's Growth.* Emphasizing the ARBA's unique ability to bring diverse industry elements together for the cause of better roads, the Association's president John N. Robertson traced Association activities through the postwar years. He especially noted its strong advocacy of an expanded federal highway program, for which a $50 billion job was urged as early as 1950.

Gen. Reybold, Association executive vice-president, told of ARBA's continued growth, with the formation in 1955 of a new roadside construction and maintenance committee, a new committee on highway lighting, the Industry Capacity Studies presented early in the year to Congress, the Association's testimony before Congress on federal road legislation, the county road conference at Gatlinburg (850 attended), and the increased tempo of its publication. The 1954 convention at New Orleans resulted in 142 papers, the Gatlinburg meeting 23, and there were 23 special reports and papers. The industry capacity studies are currently being brought up-to-date.

Enumerating ARBA's special committees, he noted also the one on specifications, with contractor members and BPR personnel; on standardization of traffic control devices, with BPR liaison; and on rental rates, with the defense department.

Gen. Reybold's parting shot: "Ten years is ample time to carry out the proposed big road program. By then we'll have another mess on our hands."

● *CIMA Meeting.* The Construction Industry Manufacturers Association, the group which comprises leading U. S. equipment manufacturers and which largely underwrites the parent ARBA, held an uneventful meeting at Miami. CIMA's president, Kenneth Lindsay of Iowa Manufacturing Co., told of the group's growth in membership, its manufacturer capacity study under the Solditt committee, and other 1955 highlights including planning of the big 1957 Road Show.

At the CIMA session Robert O. Swain, executive director of the International Road Federation, D.C., took the occasion to describe IRF's worldwide activities. Supported by construction equipment, rubber, petroleum and automotive industries, the IRF is aiding good roads associations today in 76 countries. In an exploding "motor age" abroad, over $3.7 billion was spent for roads in countries outside the United States (compared with a gross $7.1 billion at home). These figures — rapidly rising — will be stepped up further soon by such programs as Egypt's $250 billion road plan, Central America's $110 million program, and others.

The IRF's activities include fellowship programs for foreign students in the U.S., training programs for mechanics and operators abroad, a publication program, and good will contracts.

● *1957 Road Show.* Highlight of the CIMA meeting was the unveiling of preliminary plans for the ARBA Road Show and Convention to be held in Chicago in January, 1957. As outlined by Harold Hess, executive vice-president, and by Julian Steelman of Koehring, who heads the road show committees, plans are already well advanced for a show which promises to set new records in attendance and industry impact. Committees are at work on rules for allocating space to exhibitors, actual allocation details, and on housing and publicity, in cooperation with counterpart committees of ARBA. Don White, Chicago contractor, is chairman of ARBA's liaison committee.

● *Miami Exhibit.* The largest display ever staged of road materials and supplies was held in conjunction with the Miami convention. Some 55 exhibitors took part under auspices of ARBA's Materials and Supplies Division.

PRENTISS TO SUCCEED REYBOLD AT ARBA

The Association gets a new Executive Vice-President on May 1, when Maj. Gen. Louis W. Prentiss succeeds Lt. Gen. Eugene Reybold who retires at age 71.

Gen. Prentiss, 56, is retiring after 35 years' distinguished military service. A Colorado School of Mines graduate and long in the Corps of Engineers, his technical and administrative experience has been outstanding. He was recently Engineer-Commissioner of the District of Columbia, and lately in command of the Corps' Technical and Research Center at Ft. Belvoir.

Gen. Reybold who came to ARBA for a "temporary" 2 year tenure and stayed six years, was Army Chief of Engineers during the Corps' gigantic World War II program.

Why buy a truck in the dark?

"Oh, kick me!" cries Merchant Neal,
In a posture hardly genteel.
He bought trucks in haste,
Then the costly fact faced,
That he'd missed the Dodge Dealer's Deal!

If you buy a new truck after looking at only one make, it's like making a deal in the dark. A smarter way to buy is to "*spotlight*" *real truck* value—weigh and compare competitive claims with these Dodge truck facts:

Most standard V-8 horsepower of all leading makes—½-ton through 3½-ton range. You'll make faster trips—get more work done!

Shortest turning radius. You'll maneuver in traffic, and park more easily.

Biggest cabs, with biggest wrap-around windshield. You'll enjoy more comfort, safer vision.

Highest payload capacities . . . pick-ups providing up to 22% more payload than others.

Prices down with the lowest.

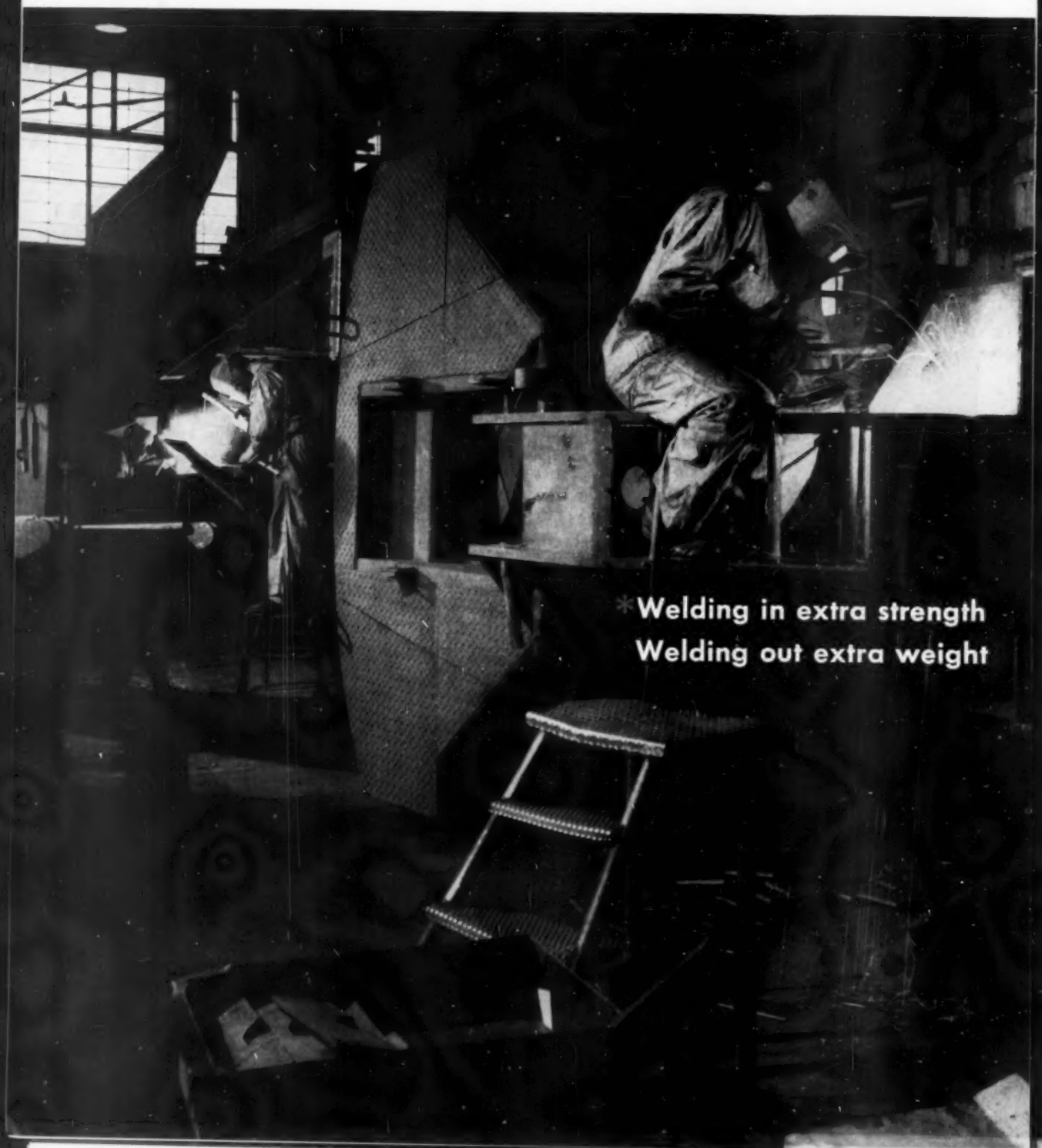
Next truck you buy, don't deal in the dark. Turn a bright light on the facts. See Dodge before you buy.

GET THE DODGE DEALER'S DEAL BEFORE YOU DECIDE

DODGE
Job-Rated
TRUCKS
WITH THE *FORWARD* LOOK

. . . for more details circle 189, page 16

what puts more guts in



P&H power shovels ?

*ALL-WELDED CONSTRUCTION

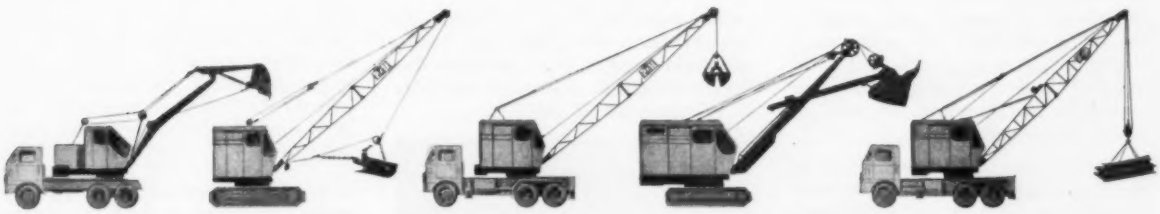
P&H engineers were first to discover that the way to put more guts in excavating equipment was to throw out old-fashioned methods and replace them with modern materials and processes.

That meant welding in extra strength. Getting rid of useless weight.

Castings that added useless weight were replaced with weldments of new, high tensile steels and rolled sections. Gussets, stiffeners and reinforcing plates were added for extra strength. Welding these into one rigid unit is the way P&H puts guts in every ounce of steel.

Years of actual service have proved the value of P&H modern engineering. Shovel users everywhere have demonstrated their acceptance by making P&H the largest manufacturer of power shovels and cranes in the business.

Your P&H dealer will be glad to point out, feature by feature, how P&H puts more guts in power cranes and shovels with all-welded construction. Also, in other ways. Harnischfeger Corporation, Milwaukee 46, Wisconsin.



For Modern Engineering, Look to

HARNISCHFEGER

POWER CRANE and SHOVEL DIVISION

. . . for more details circle 265, page 16

Better Construction Planning

NEEDED IN OUR GROWING PROGRAM

Long-range financing, earlier fund allocation, earlier lettings, simplified contracts, bigger contract size, are among steps suggested for accelerating highway work with maximum efficiency.

By A. C. Clark

Deputy Commissioner of Public Roads, Washington, D.C.

CONSTRUCTION planning can propel highway improvements at a faster pace. Planning ahead on specific projects is of course a practice of long standing with engineers and construction men, whose projects require several years between conception and construction and additional long periods to completion. But planning with respect to over-all highway construction business only recently received its strongest stabilizing support from the interest shown by Congressional road committees.

The questions asked at Congress hearings as to industries' readiness to undertake an enlarged road program, set ARBA task forces into action evaluating engineering, contracting, and material and equipment producers' capacities. An excellent example of sound construction planning.

● *Short Range Bottlenecks.* It is in the short-range period, the construction seasons of 1956 and 1957, that highway building must be accelerated through construction planning. All classes of construction have increased from $37.8 billion in 1954 to $41.8 billion in 1955 and are predicted to increase to $44 billion in 1956. *Engineering News-Record* discloses a backlog of $90.2 billion of heavy construction work piled up in various stages of planning as of October 31, 1955. It is most desirable to minimize competition with rising requirements for engineering, manpower materials and equipment in other also essential construction programs.

The earlier apportionment to the States of the increased Federal aid authorizations made available by the Federal Aid Highway Act of 1954 for the fiscal years ending June 30, 1956, and 1957, is a construction planning aid. It officially places the states on notice at an earlier date as to the exact amount of Federal aid authorizations available. It permits the states to move up programming, engineering and design schedules for projects, so that they can be let to contract much sooner than heretofore.

The following Federal aid highway authorizations and matching funds, with which an enlarged program can be accelerated in 1956, were available as of November 30, 1955:

A. C. Clark

Unprogrammed Balance Including 50% State Matching Funds	$1,685,856,000
Programmed Only	800,828,000
Plans Approved, Construction Not Started	373,644,000
	$2,860,428,000
F.A. Under Construction (11-30-55)	$1,707,039,000

The effort is now to translate these authorizations into construction contracts. It is timely to do so because an increased Federal aid construction volume in 1956 would be an interim step in developing industries' capacities for the larger task which Congress may authorize.

● *Fund Advances.* Engineering and right-of-way acquisition are problems that must be considered in speeding up the volume of construction in 1956. To provide advance funds for preliminary engineering and right-of-way, the Bureau has liberalized its procedure under a program stage designated as 1-A. Advance engineering funds are authorized separately from the principal bulk of the project to expedite planning and design. Right-of-way acquisition costs are also made eligible in advance of programming funds to the project, with the participation ratio being that in effect at the time the project is actually programmed. This is particularly important on the Interstate system because of the possible change in the participation ratio.

● *Electronic Devices.* Even with advance engineering funds provided there still remains the problem of a limited supply of engineers. As a contribution to a solution of this problem the Highway Research Board recently made a survey of time-saving methods adopted by individual State highway departments.

The Bureau engineering staff is also encouraging use of photogrammetry, high-speed electronic computers, and other new devices to expedite engineering. The AASHO Construction Committee has voted to support this effort, and proposes a committee for pooling and disseminating facts on

From a talk at the ARBA annual convention, Miami, Florida, January 10-14, 1956.

means of increasing engineering productivity, through use of electronic and other devices. It is hoped thus not to compete with the increasing construction needs of other industries for engineers, but to better utilize available highway engineers, and cut down the long lead time now required before highway construction begins.

• *Larger Contracts.* Another proposal for cutting down engineering lead time and expediting construction is to increase the length of projects for which highway contract offerings are made. Longer highway sections would have a tendency to decrease the amount of engineering required by avoiding repetition of plans for standard sections and drainage structures. It would be more economically feasible to make subsurface explorations for sand and gravel deposits within or near the right-of-way through aerial or electronic methods.

Also contractors could spread the cost of plant moves over more work, better utilize equipment through larger job loads. In addition, our records indicate that the highway contractors desire more of the larger jobs.

• *Lump Sum Bidding.* The advantages and disadvantages of the lump sum bids are also being studied. The possibility of decreasing the details of engineering especially as related to the measurements required under control method are being analyzed. The lump-sum method of bidding may be more applicable to such work as surfacing, bridge superstructures and some types of grading. However, careful evaluation of the method must be made with respect to each item of operations before acceptance of the method can be approved.

• *Autumn Awards.* Suggestions have also been made that a larger number of contracts be let in the fall to give the contractors more lead time to firm up orders for cement, steel or other items that may be in tight supply during the spring and summer construction seasons. This would also allow the contractors to purchase certain items such as reinforcing steel during the slack season and store them on the job sites.

Some states practice preadvertising of jobs and the development of contract letting schedules considerably in advance of lettings so that contractors can know what to expect and for what jobs they are best equipped, and so that they will have plenty of time to investigate the job requirements and the availability and cost of materials, etc. In some northern states, highway departments go over the preadvertised jobs with contractors before snowfall, so that such jobs can be let promptly in early spring.

• *Better Team Work.* It is generally agreed that highway construction is team work between the highway department, the engineer, the contractor, the material supplier and the equipment manufacturer. The ARBA task forces are now studying current highway construction problems and any suggestions they make for improving construction planning will be gladly considered.

The construction task force has just mailed out questionnaires to all highway contractors in the nation. Here is an excellent opportunity for each contractor to tell us, through additional comments at the end of the questionnaire how improved construction planning can accelerate the road job. *A. C. Clark*

• *Simplified Specifications:* In the new specifications being prepared for Federal highway work there is a trend toward the elimination of the phrase "or as directed by the engineer" in favor of more definite performance specifications. This permits the contractors to utilize any type of equipment that will do the job rather than require that he purchase a specific type of equipment. This is very noticeable in earth compaction specifications where the contractor can now utilize any one of several types of equipment as long as he meets specified compaction standards.

Initiative is also being taken by the Bureau of Public Roads in cooperation with the states in bringing up to date state specifications to eliminate restrictive provisions and obsolete methods and to thereby allow the contractor more latitude in the prosecution of the work.

• *Contractor Payments.* A study is also being made of state practices in paying for materials delivered on the job but not yet incorporated in the work. Some states have started the practice of making partial payment on materials such as fabricated steel when delivered on the job but not yet incorporated in the work. This has a tendency to decrease the amount retained on progress vouchers, and because the contractor receives larger payments it expedites the delivery of additional material. While Federal aid regulations permit participation of Federal funds for materials only after they are incorporated in the projects, the states to expedite the work can pay with their own funds for materials delivered on job site and later receive reimbursement of the Federal aid share when the materials are incorporated in the project.

• *New Bureau Awareness.* Perhaps most important is the growing Bureau awareness of the need for taking overall action in construction planning. Bureau field engineers are encouraged to discuss time-saving methods with the states. Consideration is being given to available contractors' capacities in various categories of work, and stage construction is being encouraged to better utilize such capacity.

• *Push Grading.* The tight supply of steel, and of cement in some areas, will require more effective construction planning. There are several possibilities in meeting tight material supply:

(1) Concentrate on clearing and grubbing, grading and substructures early in 1956, and take the risk of price changes by the time material orders are accepted; (2) Consider state-furnished steel during the tight supply period; the contractor bidding on erection of superstructure. (3) Use of conventional concrete bridges and precast, prestressed concrete structures to ease the tight steel supply where cement is available.

Contractor utility claims

A Virginia contractor has had a sizable claim for delays caused by the failure of the utility company to get its poles removed from the right-of-way. The claim was prepared and presented to the Highway Commission, but was not allowed because the Special Counsel for the Department ruled that it had no legal standing due to the clause in the specifications denying any adjustment beyond a mere extension of time. In the case in point the Highway Department had to enter suit against the utility and, through a court order, force the removal of the utility poles from the project.

This is a serious matter and it is receiving attention from your Association. Meanwhile, we urge that you protect your own interests in similar cases pending final decision of the question. — *Bulletin of Virginia Road Builders Association.*

Contractor Problems

Contractor's Eye View of Urban Federal-Aid Work

By John Bratten
Vice-President, Ames & Webb, Inc., Norfolk, Virginia

IT IS A LITTLE difficult to discuss the construction of Urban Federal-Aid Projects from the viewpoint of all the contractors working in such areas. Problems which are common in one are rare in another. Our own experience in the past seventeen years has brought us face to face with the urban problems of the Norfolk area. For the most part every urban project is a jumbled jig-saw puzzle. This is true from the viewpoint of the contractor and, perhaps to a lesser degree, to everyone having any connection with the planning and construction of it. The most successful contractor is the one who can find the missing segments of the picture and fit it into place in the shortest space of time.

Let's take a look at some of these jig-sawed pieces which must be fitted together if we are to get the project built and accomplish the object we had in mind when we bid — namely the making of a profit for our stockholders. Right-of-way clearance is our first major segment. The path of the construction crew must be cleared of houses, of trees, of utility poles lines on the surface and sewer, water and utility lines and ducts from the underground area. Here, as in all other phases of the contractor's operations "time is of the essence."

We realize that the municipality is a public service, public relations unit and its well-being depends upon its ability to keep its citizens happy. At the same time, it must be noted that some advanced work and planning seems possible and would certainly be beneficial to the contractor. The overhead power and telephone lines might be moved and some of the housing work done before the start of operations on the street.

The electric and telephone companies are bound by their own rules to plan in advance for the major changes which may occur on an urban project. The scheduling of materials for this work is often a bottleneck which can spell sixty or ninety days delay for the contractor, disrupt his plans for the use of his organization and equipment and bring down the wrath of citizen and official alike upon his head for the inconvenience suffered by them.

The task of clearing underground utilities from the right-of-way is usually undertaken by the municipality. This throws an unusual work load upon their crews and creates a difficulty for the contractor in obtaining the expected production from men and machines. Yet, this work must be done carefully and planned fully or its cost can be a disaster for the contractor. A broken water line and the resulting flood in the grade can tie up a job indefinitely during certain seasons of the year.

We realize that the municipality is often reluctant to start utility relocations until the contractor begins construction. However, the advanced operations which would give the contractor a clear right-of-way could easily result in a lesser period of inconvenience to the citizen than is possible under the present system of simultaneous starting dates.

Another major segment in our jig-saw puzzle comes when construction has started. This is the maintenance of traffic. Every citizen expects full and immediate access to any part of the project at all times. Every intersection must carry two-way traffic in each direction; every driveway must be kept in better shape than it was at the start of construction, and no business establishment must be denied access for its customers. If we fail here by blocking an intersection, driveway or business entrance the irate citizen calls his City Manager, Director of Public Works, the Highway Department and his Congressman. Traffic, he insists, must be moved in both directions, on smooth pavement at all times during construction.

Then, there is that jig-saw piece in the form of a special provision which states that "the contractor shall cooperate with the City in the construction of this project." Cooperation is necessary and not an unusual requirement. In one case, however, it was interpreted as meaning that the project must be built one block at a time. It is not unusual for the project to be divided into several sections but this, too, is costly. Unless otherwise stated, the contractor should be able to assume that an unobstructed right-of-way in which to work is available and that the project is one operation rather than a series of sections to be completed before moving on.

We believe that the first step in eliminating some of the delays from utility companies would be to advise them in advance of the preparation of plans of the program. They might then be furnished with plans as early in the development of the project as possible so that arrangements for financing, materials and work forces could be planned in advance and made available when needed. Thus, three obstructions could be cleared from the right-of-way in less time than is now possible.

We feel that the second step should lie in the direction of coordinating the efforts of the municipality and the contractor. Such a coordinator was assigned on several of our projects whose duty it was to uncover and check the elevation of water and sewer lines. This coordinator should be clothed with the authority to order out work forces to adjust lines found to be in the path of construction.

(Continued on page 83)

As presented as part of a panel on Urban Federal-Aid Projects at the 9th Annual Virginia Highway Conference, Lexington, Virginia, November 3, 1955.

Holy Writ states that man cannot serve two masters but the contractor on urban projects serves three — the Highway Department, the City and the U. S. Bureau of Public Roads. This is not a particular hardship on the normal construction operations but if the plans must be changed it is a major disaster. All three agencies must approve such changes and the time consumed is often a costly thing for the contractor. Some of these change orders have been in the mill for an entire construction season and, if they are major in nature, can make the project useless. The chain of command is long and expensive.

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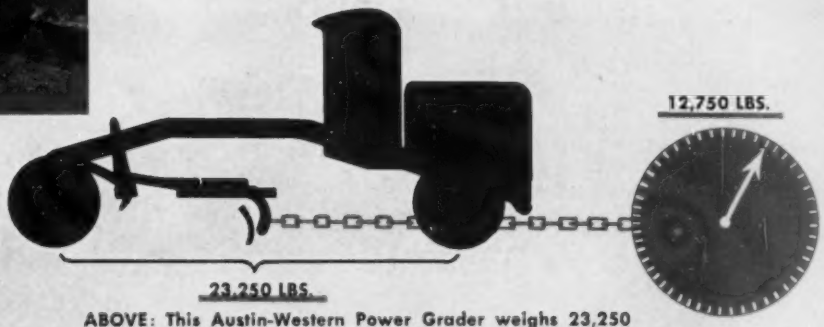
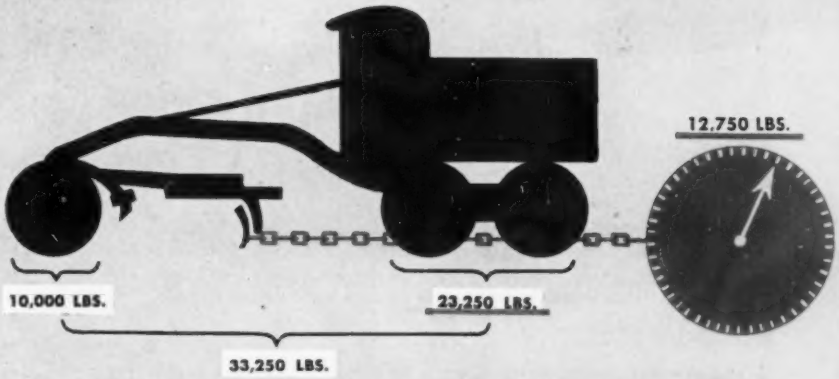


ABOVE: This Austin-Western Power Grader weighs 23,250 lbs.—all carried on driving wheels. Working in average dirt, it has a blade pull of 12,750 lbs.

BELOW: To obtain the same blade pull, an ordinary motor grader would have to carry 23,250 lbs. on its *rear drivers;* PLUS about 10,000 lbs. on its *dead front end,* for a total of 33,250 lbs.



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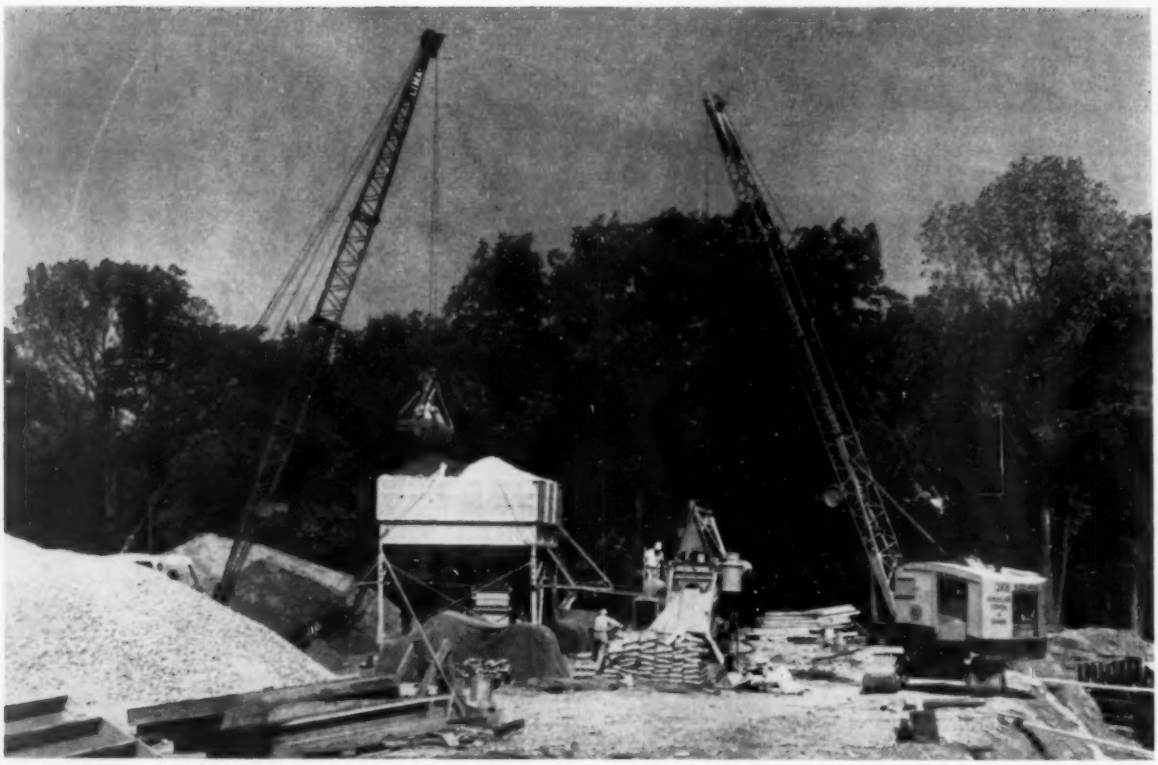
. . . for more details circle 178, page 16

Big Culverts Poured

● How batched aggregates were dumped into the paver skip and cement added by hand.



● General view of the Binanbatch plant, Multifoote paver, and Lima and Koehring cranes used in handling materials and making and setting concrete for the box culvert.

● Winslow portable wheelbarrow loader in action on deck.

HOW would you go about constructing 10 large box culverts, totaling 2,800 cu. yd. of concrete spaced along a 6-mile new location, with a time limit of less than 8 weeks?

One contractor's answer, carefully planned for the particular off-road conditions, is pictured here. This assembly is the largest of three culvert outfits used during the 1955 summer by G. H. Allen, contractor of Vincennes, Ind., for structures in a state highway relocation near New Haven, Ill.

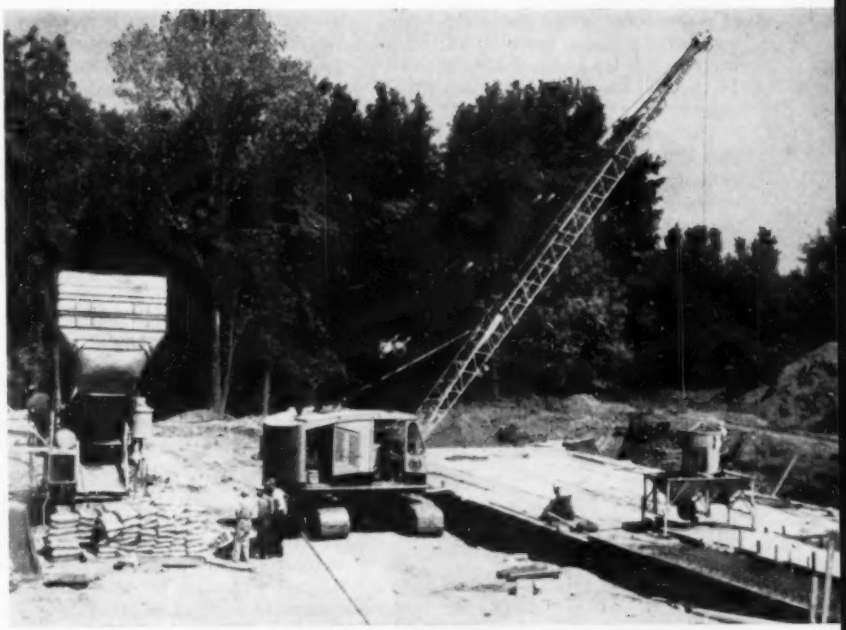
The culvert pictured here is a quadruple-boxed structure, 39½-ft. wide by 190½-ft. long, designed to permit passage of flood waters of the

with Simple Portable Outfit

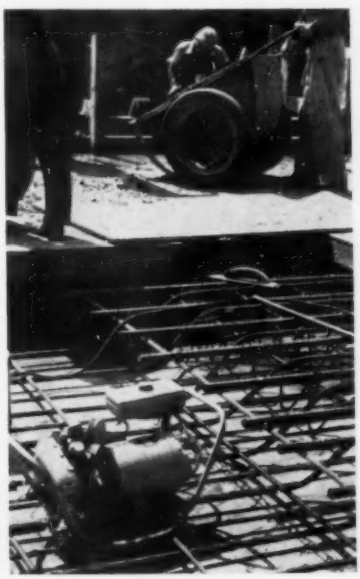
Wabash River during periods of bottom-land inundation.

The stockpiled sand and stone were loaded by a Lima ¾-yd. crane into a portable Winslow Binanbatch plant, consisting of a two-compartment 20-yd. bin and calibrated weightbatcher on a crane rail. Batched aggregates were dropped into the skip of a Multifoote 27-E single-drum paver, along with the cement, unsacked by hand. a second crane, a Koehring 304 with 1-yd. drop bucket, delivered concrete either directly into place or to a Winslow rubber-tired barrow loader located over the culvert. Four ½-yd. barrows deposited concrete for the footing. The largest day's placement of 168 cu. yd. in 10 hours was limited by the placing operations.

The job was part of a subcontract under a job held by S. J. Groves and Sons, Inc., and J. C. O'Connor Construction Company, in joint venture, for an approach road to a toll bridge over the Wabash River. R. B. Dexheimer was project manager for the joint venture and Wm. Machin was Supt. for the prime contractor. Kenneth Hudson was superintendent for C. H. Allen. Jack Frank was resident engineer for the Illinois Division of Highways.



● Second crane swung around from the paver to barrow loader.



● The multiple-box deck pour in full swing, using four barrows and four or five Master vibrators. (Right): One of the vibrators and details of reinforcing for deck slab.

Big Snow Fence Footage

Is Installed Manually

RECENTLY a regular autumn drama was reenacted in Pennsylvania consisting of the installation of a huge footage — in fact, mileage — of snow fence along the state highways. According to Secretary of Highways Joseph J. Lawler, the fence totals 14,100,000 lin. ft., or more than 2,670 miles.

The cost for erecting the fence, about $425,000, is believed to be more than justified by the reduction in snow plowing and the protection to the traveling public afforded. Some 20,500 miles of road are involved.

According to Secretary Lawler, the department of highways has not found it feasible to develop mechanical means of driving snow fence posts or of expediting the setting up of such fence. Since the work is usually done at a time when the fields along the highway are wet and soft or freshly plowed, the footing has been extremely difficult and no rubber-tired vehicle (such as is often used in the western plains(can get into the fields to serve as a post driver.

The fence which is usually stored at a nearby site is hauled with minimum trucking and loading costs, and erected by gangs using a sleeve-type or ordinary driving cap, as illustrated in the accompanying pictures.

● A sleeve-type driving unit operated by two men.

Ohio Turnpike equipped for its first winter

The 241-mile Ohio Turnpike, opened full length to traffic October 1, is served by a maintenance staff of 150 people working out of eight modern buildings plus stand-by emergency facilities.

This highway which passes through the cold and sometimes snowbound northern Ohio region along Lake Erie, is expected to offer a severe maintenance problem at times. For the first winter, stockpiles have included 50,000 tons of grit (like stone slag or cinders treated with calcium chloride) to combat icy conditions. Another 3,000 tons of silica sand will be used on bridge roadways. Snow fence, totalling 40,000 lin. ft. has been purchased.

Self-propelled equipment purchased for year-around maintenance includes:

48 Two-ton general utility trucks, with front snow plow for snow and ice control in the winter. Trucks are used for hauling and other purposes in summer.

11 Four-wheel-drive trucks, with front and wing plows to combat heavy snows and drifting. At least three will have rotary plows. Used in summer for hauling and other purposes.

8 Half-ton pick-up trucks for quick moving of tools and supplies.

7 ¾-ton pick-up trucks for special uses (2 for electrical repairs, 2 for signs, 1 for other purposes.)

4 Pick-up sweepers to clean away cinders.

8 Motor graders, used in summer for cleaning of ditches and cutting of banks; in winter, for scraping of ice.

2 Bituminous distributors, each holding 800 gallons for maintenance of shoulders, spraying, and "paint patching."

2 Rollers for use on shoulders.

2 Sickle-bar mowers.

1 Traffic-lane marker.

2 Aerial ladder trucks for maintenance of lighting and inspection of structures.

1 Small traffic-lane marker for interchange roadways.

1 Multi-purpose excavator.

1 Truck-mounted crane for excavation, and repair of slides.

Other equipment now on hand, not self-powered, includes air-compressors, concrete mixers, reel-type mowers, joint sealers, welders. Each maintenance building will house equipment for washing and repairing maintenance trucks, and a gasoline tank of 8,000 gal. capacity will be installed on the grounds.

● Ordinary driving caps used with mall.

● How Pennsylvania snow fence was installed late this past autumn.

Contractors Eve View

(Continued from page 78)

The third step would be a simpler plan. For example, so much data is presently put on the topographical sheets that it is difficult for the foreman in charge of grading operations to find the needed information on them. A simple set of plans showing utility lines which are under the grade would be helpful. He and the City or other forces could then locate the lines in advance and check their elevation. The detection of metal pipe lines beneath the ground with the modern devices available is a simple and inexpensive task and the results are of great value.

Lastly, we urge the municipalities to consider the over-all time and inconvenience to the public in the construction of the urban project. If it can be shortened by a partial disruption of traffic in the advance removal of utility lines, this fact should be taken into consideration.

The urban project has increased the potential work available to the contractor; it has aided immeasurably in the solution of the pressing traffic problems of our City, and its construction under the Federal-Aid Act has saved our citizens many tax dollars. There are problems connected with them, as we have noted, but we believe that the team of Federal-State-Municipal agencies and contractors will find a solution to all of them. Thus, our jig-saw puzzle will become a picture of progress and prosperity.

Personals

GEORGE H. DENT, has joined the staff of the Benjamin E. Beavin Company, consulting engineers, Baltimore, Maryland. Mr. Dent, recently chief engineer of the Asphalt Institute, served the Institute for the past 15 years. During the past year he has been President of the Association of Asphalt Paving Technologists.

NEWTON F. RONAN has been appointed Superintendent of Operation and Maintenance, New York State Department of Public Works. He was formerly Assistant District Engineer at Albany and has been employed continuously by the Department since 1911.

BRUCE TAYLOR of Tampa, Fla., has been made president of the Toncan Culvert Manufacturers Association of Cleveland; J. Franklin Beall of Portland, Oregon, vice president; J. M. Wood of Memphis, Tennessee, secretary-treasurer. Hubert E. Snyder continues as managing director.

HENRIK E. STAFSETH of Ottawa, Michigan, has been elected president of the Southern County Road Association of Michigan for 1956.

JACK KNOTT is the new assistant manager of the Associated General Contractors of Missouri, under manager J. Geo. Robinson. E. C. L. Wagner, long-time manager of the Association remains as a consultant in retirement.

Kansas realigns staff

Several top engineering personnel shifts are announced by the Kansas Highway Commission in a realignment to handle larger programs ahead. Frank Virr has been added as an assistant to Walter Johnson, state highway engineer, being transferred from design chief. He will be in charge of engineering prior to the construction stage. W. S. McDaniel, also assisting Johnson, will have charge of the departments of right-of-way, contracts and proposals, construction and maintenance. The move is designed to free Johnson, for greater contact over the State.

H. O. Reed, formerly engineer of construction, becomes engineer of design, a move which will give the design department the practical experience of a veteran construction man.

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. . . for more details circle 256, page 16

The Consultant's Growing Role

Some state highway departments and most toll road agencies have turned increasingly to consulting engineers. Other highway officials say, "No," that consultants weaken their own departments. It's a highly controversial subject.

By Duane L. Cronk

STATE highway departments, deep in record construction programs, last year (1954) employed 18,034 staff engineers. They could have easily used 4,000 more, they said, when polled by the Highway Research Board. There was hardly a state that did not admit to a shortage of engineers.

In order to get the work out, many have turned to outside consulting engineer firms, of which about 450 exist in the highway field. M. Earl Campbell of the Highway Research Board, and L. R. Schureman of the Bureau of Public Roads have reported that two-thirds of the highway departments retained consultants in 1954 and that these engineering firms accomplished the work of 4,192 additional engineers. About 68% of them were used for road design work and 18% for bridge design. This is in addition to the substantial volume of work that consultants handled for toll road authorities.

This is an action that has repeatedly been recommended as one way for the states to beat their engineering shortage. Obviously the advice has been accepted. The result is that consultants, used to "feast or famine" existances, find themselves hustling a boom business these days. The total road design job they assumed in 1954 was 166% larger in dollar volume than in 1953. Consultants took on 430 highway projects in 1954, representing $2 billion worth of construction, compared to 329 the year before, representing $766 million worth of construction.

Consultants also handled 121 bridge design jobs, representing a dollar volume of $315 million, or 30% more than the load carried by consultants in 1953.

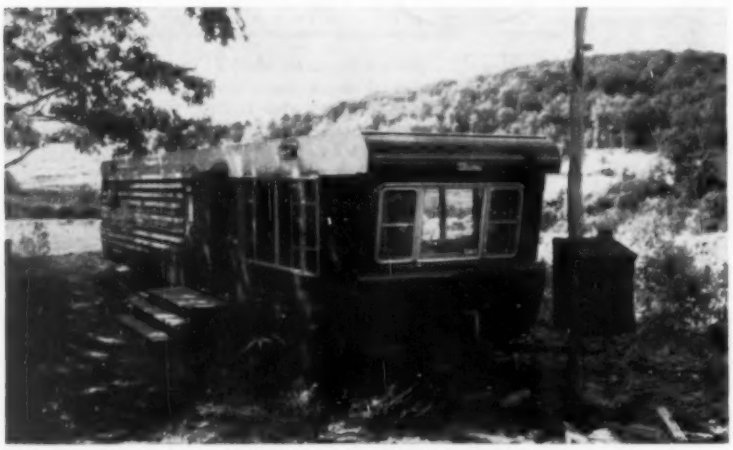
By far the greatest number of consulting engineers retained among the states was by New York. The number of engineering positions "affected" by consultants in this state was 2,500 in 1954, according to the Campbell-Schureman survey. Other major users of consultants were Connecticut (205), Massachusetts (366), Ohio (145), and Indiana (118). These five accounted for 80% of the consultants retained by the state highway departments.

Consultants Exceed Staff

The extent to which some states turned to consultants may be better illustrated by comparing the number of consultants retained with the size of the department's own staff. For examples: Consultants in New York State (2,500) outnumbered staff engineers (1,839) by 36%, and Connecticut's 163 engineers were outnumbered by 205 (or 32% more) consultants. Other states in which department men were outnumbered by consultants included District of Columbia, Rhode Island, Maryland, Massachusetts, Indiana, and Ohio.

Consultants handled work in some states equivalent to 25% of the current construction program.

Many states, on the other side, retained no consultants in 1954, including the largest state highway department of all — California, which has a staff of 3,388 engineers. Others were Arizona, Arkansas, Florida, Georgia, Nevada, North Carolina, Oregon, Texas, Utah, Washington, and Wyoming.



● Consulting engineer's field office — that of Wooster Engineering Corporation on the Massachusetts Turnpike, where this firm served as Section Engineers on location, plans and supervision under Howard, Needles, Tammen and Bergendorf, Inc., general consultants.

Consultants Branch Out

The traditional role of the consultant, heretofore, has been to provide assistance only on special projects which departmental engineers were not qualified to design and supervise. In such situations, the consultant could contribute specialized knowledge, techniques and manpower. Their forte was bridge design and traffic study, particularly, and other projects that came up occasionally.

Robert Reindollar, former highway official, now a Baltimore consultant, declared recently:

"There are certain types of work that are not recurrent in the large projects — the thruways and the big bridge jobs — for which the highway departments cannot, on an economical basis, afford to employ the qualified personnel to handle that type of work. That is essentially a consulting engineer's field, and should be so recognized."

Consultants are playing other roles today, however. They are being retained not only for their specialized knowledge, but because they can provide a pool of engineering manpower. Consultants are handling the "over load."

In fact, the traditional role of consultant as a specialist in unusual and difficult design apparently is even reversed in cases. The Director of Public Works in Delaware, reported recently that outside engineers are retained on projects "that are *not* of unusual difficulty, or that require specialized knowledge and experience in their design," but in order to relieve the excess load on the department.

The use of engineering firms varies from state to state. The range of services they provide include:

- Advice only, based on an impartial study of traffic.
- Advice and preliminary survey work.
- Actual location and design work, and preparation of cost estimates.
- Drawing of plans and writing of specifications.
- Supervisory and administrative chores during construction.

Supervising Construction

No longer confined to producing objective traffic studies, making recommendations, or designing bridges, they now do considerable more road design work, write specifications and even supervise construction.

In a report on use of consultants published by the Highway Research Board recently, the authors stated that construction supervision is "only rarely" handled by contract with consultants. They listed just four states that followed that practice in 1954. Some consulting engineers are specializing in this function for toll road authorities, however, notably Howard, Needles, Tammen & Bergendorf. This firm, headed by Enoch R. Needles, now president of the American Society of Civil Engineers and former president of the American Road Builders Association and the American Institute of Consulting Engineers, has a force of 1,200 engineers. About 50% of them are in the field, supervising construction of projects of their own design.

The current wholesale use of consultants, not for specialized design counsel or third-party studies, but in a *production* capacity poses some pertinent questions, critical officials say. Those who advocate retaining consulting engineers to ease the total engineering shortage need to back up their recommendations with answers to such queries as:

- "Do consulting engineers, by offering higher salaries than the departments, bring *more men* into the highway field, men who would not come in otherwise?"

"Are consulting engineers more *productive* per man than state highway department men, because of the profit motive, administrative shortcuts, or better equipment?"

"Can consultants operate close enough to true department engineering costs to avoid scandals and time-consuming investigations?"

As a *specialist* in his traditional role, the consultant is under no obligation to answer such questions, but in a *production* capacity, he may expect to stand comparisons from time to time, these officials say.

A Controversial Area

The contrast points up a very active difference of opinion on the use of consulting firms to handle highway assignments. Some say that consultants don't solve the engineer shortage, but that they worsen the state's plight by "pirating" men off the highway department's staff. Others say the traditional arbitrary method of selecting consultants and their high cost place them under the constant threat of a scandal for real or imagined collusion.

Alfred Johnson, executive secretary of the American Association of the State Highway Officials, declares that consultants cannot be relied upon to add much to the total engineering supply. He told fellow highway officials recently, "We will have problems in staffing the departments to handle a large (roadbuilding) program. Consulting engineers can help to some extent, but they will not be able to add greatly to the manpower reservoir; and if they materially enlarge their staffs, it is assumed they would have to raid the highway departments to get the experienced and qualified people."

Thus begins a "vicious" cycle — the consultants working for a state pay larger salaries and attract staff engineers to them, the department is weakened and more dependent than ever upon consultants to help carry the load. Some see the day when state highway departments will be reduced

When to Employ Consulting Engineers?

Here is the story on use of consulting engineers. Although states have been advised to turn to consultants to ease their engineering shortage, they are certainly not all agreed that it is good for them in the long run. Some highway department leaders feel that consultants may perhaps be more trouble than they are worth. This trend of feeling, where it is reflected, is usually found in those many cases where the consultant is called in to help the routine *work load*, more than to act in his traditional role as a "consultant" or specialist.

This distinction is made in the accompanying report, which points out that it is in this new role of *production* that the consultant draws criticism, whether or not unjustly.

Unfortunately, it has been hard to get the consultants' point of view. They are not providing answers to these questions being put to them — or about them. Perhaps they're too busy, and that may be their best defense. "Look at us. We're rushed to death. Of course we're needed and wanted, or we'd have time to make out a case for ourselves." We don't know. We've talked with enough people about it, so we are confident Cronk is not saying anything here that isn't common knowledge, but one would wish it weren't so apparently one-sided.

Perhaps ROADS AND STREETS' readers can contribute constructive ideas and factual data on this live and important subject —*The Editors.*

Consultants' Responsibilities Must Be Clear

The fundamental that a consulting engineer staff must never overstep prerogatives belonging to the public roadbuilding agency employing it, is emphasized by developments recently in Maryland.

The Maryland Legislature through a committee has brought a local consulting firm into the spotlight over policies employed by this firm in acquiring right-of-way through real estate companies.

The claim was made that the consultant acted in a manner too far removed from the control of the voters and taxpayers. The consultant, apparently, was thus publicly scolded for taking the initiative in a situation where good management and leadership were lacking in the State Road Commission.

Clearly a consulting engineer can only act as an agent of the highway department, turnpike agency, municipality or the governmental body employing it. The consultant's duties and delegated responsibilities must be clearly defined. And in order to be explicit, the agency must have its own policies spelled out clearly enough to "know its own mind."

to skeleton agencies, obtaining their engineering services by contract. As one highway man put it, "If this keeps up, someday we'll all be working for consultants."

(The AASHO, concerned about the necessity of "farming out" much design work to consultants, is starting a series of regional clinics or conferences to help build up design "know-how" among department engineers.)

Consultants counter these complaints adroitly. They point to aggressive recruiting programs in which they offer substantially more income to prospective highway engineers than the departments and thus increase the total supply from among graduates who would go into other engineering fields.

"As for the charge of 'raiding' highway departments," a partner in one large Eastern firm said, "most state contracts contain clauses forbidding the consultant to draw from highway department personnel. Our own recruiting efforts are directed at engineering graduates, whom we can teach in our own methods. It is very infrequently that a state engineer joins our forces."

Critics Make Unfavorable Cost Comparisons

Those who would rather not use consultants point out unfavorable cost comparisons. The chief engineer of the Missouri State Highway Commission, Rex M. Whitton, told an audience of engineers recently that consultants cost two to three times as much as department engineers. Consultants require from 90 to 200 man-hours per sheet to complete bridge design plans, he said, work that staff engineers do in 30 to 100 man-hours.

"This probably represents an exceptional case," he said, "but some time ago bridge engineers saw a work sheet on an estimate prepared by a consultant bidding on a bridge project. It was both revealing and interesting as to how costs were computed. This sheet fixed the man-hour charge in this case at $7, a figure reached by using $3.33 per hour as the wage scale, then multiplying by 2.1. Incidentally, after the actual estimate of cost had been decided in this particular bid, another 25% was then added to care for 'inefficiencies'."

Mr. Whitton compared this with a design job performed by staff men in which engineering amounted to only 2.24% of final construction costs. Consultants in this case would have cost four times as much, he claimed.

In spite of such experiences, Missouri is using more consultants than ever before and for more types of work. The state official offset the harshness of his criticism by saying that his department is depending on consultants to help solve its manpower shortage and recommended their use by other states.

A broader view of private engineering costs was revealed in a recent poll of 28 state highway departments, 80% of which believed that consultants do cost more than staff production, 10% said less, and 10% said about the same.

It should be recognized, consultants say, that their prices include items that highway departments do not figure in their engineering costs — administration, equipment, buildings and many other items. Any fair comparison of costs should include all accounting factors. In some states the accounting system makes that impossible.

Another charge leveled at consultants is, "We have a hard time convincing them to do things our way." Large consulting firms operate over large areas and assignments are still not so frequent as to permit all consultants to know the peculiarities of the various departments. There is an inevitable period of getting acquainted that is usually hard on both parties.

Because of this, the highway director of one midwestern state declared recently, "We don't like to use consultants, we don't like to, at all."

States that retain consultants frequently have gone far in eliminating such friction. Highway Commissioner Newman E. Argraves of Connecticut believes that closer liaison can iron out differences as they arise. By following even the closest details of design work assigned to consultants, his organization has discovered that final plans can be as close to its preferences "as could possibly be accomplished without using our own forces 100%."

Other departments have developed similar procedures for working with consultants to mutual advantage.

Comparison Difficult

The whole area of engineering productivity is so variable and unexplored that few even attempt to compare the per-man output of highway department forces to those of consultants. The consultants themselves are so much in demand that they don't feel they need to make out a case for themselves in this respect. One might assume that the ligitimate profit motive, businesslike administration and other factors typical of a "free enterprise" operation would operate here, too, to increase efficiency.

Undoubtedly, as the volume of highway work builds up, the trend of turning to consultants will increase, even among those who believe they might thereby be weakening their own organizations. The frictions that arise now from poor working relationships will probably ease as both officials and consultants learn more about each other's procedures. As one highway director put it:

"We have had to learn to work together sometimes from different points of view and procedure, but we never would have got out the work that we did last year without our consultants."

MOTOR TRUCK FACTS. This 54-page data book, issued by the Automobile Manufacturers Association as a companion to "Automobile Facts and Figures," contains valuable charts and tables of use to highway and urban planners. For free copy, write Automobile Manufacturers Association, New Center Building, Detroit, Michigan.

Slide Stabilization with

DRILLED HORIZONTAL DRAINS

By William L. Eager
Division Materials Engineer
Bureau of Public Roads, Denver, Colorado

Wide range of slide control experience confirms that removal of ground water is the key to stability.

STARTING with exploratory work in 1952, Division 9 of the Bureau of Public Roads each season has installed drilled horizontal drains to stabilize slides in the Jackson Hole area of Wyoming, which has a bad slide record. Typical conditions for slides exist here. Topography abounds in rounded hummocks and swales. Often only the unbalancing effect of constructing a new road is required to set off large downhill earth movements. Historically, the famous Gros Ventre slide occurred in this locality in 1925, loosing 50,000,000 cu. yd. of earth to form a 250-ft. dam across the Gros Ventre River, the lake thus formed destroying a village downstream.

We would like to avoid slide-prone conditions, but this requires an understanding of the complexities involved and prediction of whether construction would result in slides. Our limited experience does not allow us consistently to do this. However, as our slide control experience increases we hope to anticipate some slides and take necessary steps for stabilization.

Once the slide has occurred, stability of the material involved radically decreases and the entire mass becomes open to penetration of surface water. Since it frequently takes little decrease in earth stability for a slide to start our theory is that it should not take much of an increase in stability to correct the condition. Following this theory, we have attempted to stabilize slides by drainage. This is accomplished by use of a machine which operates on core drill principle, but with greater power and capacity.

In cases of flat slopes, vertical holes have been augered to locate subsurface flows so that horizontal interception drains could be properly located. In steeper slopes, horizontal holes only were drilled in hopes of using them for drains if they should penetrate a subsurface flow. The native material was not adaptable for drainage purposes, but by forcing sand back into the hole with a reversed auger rotation it was possible to drain the bank.

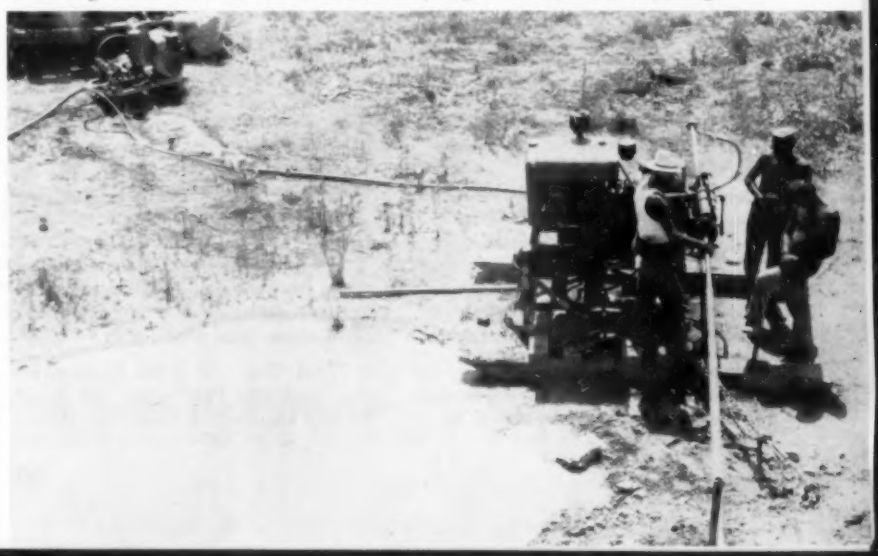
How Drains Inserted

So-called "horizontal drains" are actually drilled on an upward slope of 2 to 8 degrees, although the effect of gravity may pull drill rods downward. The 4¾ in. dia. bit drills a 6 to 6 in. hole until solid bedrock is encountered, or to the estimated location of the slip plane. These two locations are the most likely to produce flows of water. The holes are commonly drilled towards and under areas which are wet and seepy. Drain pipe inserted in the hole is either 1½ in. or 2 in. galvanized water pipe or tubing. Except for sections near the surface, the pipe or tubing is all perforated (5/16 in. - ⅜ in. holes on 3 to 4 in. centers).

If the drill hole is straight and smooth, the pipe can be inserted by hand. But if the drill has been deflected by large boulders or rock planes, or if there has been cave-in of gravel and boulders, insertion may require more force. This can be accomplished by insertion of the drain pipe through the core drill head, in the same manner as a drill rod, using hydraulic pressure and rotation to force the drain pipe into the hole. A cap is placed on the first section of pipe to prevent clogging during insertion.

● *Case Example.* Horizontal drains have been installed in numerous locations with satisfying results. The slide at Station 800-806 on the Togwotee Pass road resulted when new fill material was placed on side-hill ground made unstable by subsurface flows. This caused an initial settlement of

● Drilling horizontal drain hole into slide area, Togwotee Pass Road, Wyoming.



Condensed from a paper given at the annual meeting of the Western Association of State Highway Officials, Jackson Lake, Wyoming, Sept. 9-10, 1955.

● White lines show approximate radial pattern of drain locations, drilled in slide area — Togwotee Pass Road, Wyoming.

5 ft., increasing to 25 ft. within a month. A series of 16 horizontal drains were drilled for a total of 1,685 ft., and 2 in. perforated casing installed in 1,196 ft. of the drains. Twelve of the holes produced flows of 10 to 15,000 gal./day and several wet areas were effectively dried up. To complete the stabilization of this slide, one additional hole was drilled near a seepage area to a depth of 200 ft. and cased for 90 ft. with perforated pipe and 10 ft. with solid pipe. This drain produced an initial flow of 4,000 gal./day with a rapid drop to 500 gal./day, typical of this type of drain.

● *Another Example.* Another Togwotee Pass slide occurred where support for the hillside was decreased by a through cut. The hillside material broke loose 300 ft. from centerline, settling and moving downhill with a corresponding upward movement of the roadway of about 3 ft. Such movement reoccurred each time any effort was made to excavate to designed grade. We drilled 5 drains here with a total length of 815 ft., but the results were disappointing as the flow was negligible, and the slide continued. The area now appears to be stabilized, following placement of a metal retaining wall in the upper ditch line and removal of a large mass of earth at the head of the slide.

● *Third Case.* At a fill location on the Togwotee Pass where 30 ft. of fill was required at centerline, downhill movement occurred during construction. A number of vertical auger holes were drilled above and below the fill and free water was found at depths of 3 ft. to 10 ft. We attempted to drain off some of this water from under the fill with augered holes, angled back under the fill from the toe, but had little success because the rocky, plastic clay type of material was not suitable for this equipment.

A year later water was found to be running out the top of some of the vertical holes. In an effort to intercept this water, a drainage ditch about 12 ft. deep was dug parallel to the road and about 140 ft. uphill. It intercepted a light flow of water which was carried in a lateral ditch to a culvert. Later we installed 5 horizontal drains from the lower side, totaling 662 ft. Water did not start coming out until 4 or 5 days after installation at a rate of 10 gal./day for five pipes.

Later, when the fill showed evidence of continuing settlement, we installed four drains totaling 670 ft. in the hillside above the road, which were drilled and cased full depth. The flow ranged from a seep up to 11,500 gal./day the first day, and decreased to 8,600 gal. by the second day. The drains were flowing well when observed a year later, as were the drains installed below the fill previously. There was no evidence of further movement in the fill.

● *Fourth Example.* Another slide in this vicinity was called the "bentonite" slide because of the known presence of bentonitic material. In 1951, a through cut of 25 ft. was excavated through the lower part of an old slide, progressing to within 6 ft. of the designed grade, when movement of the old slide began. This movement extended from the downhill bank of the cut, up the hill for 350 ft. and lengthwise of the road for 200 ft. It had the typical rotating movement, with the head of the slide descending and the toe rising. No further excavation was done that season and in 1952, some vertical and horizontal holes were augered into the slide in an attempt to locate any subsurface flows. Free water under pressure was found at a depth of 30 ft. at a point near the middle. Surface drainage ditches were constructed 400 ft. uphill to drain a small pond and divert surface flows. Some 29,000 cu. yd. of material were removed from the slide to decrease the weight causing movement.

During 1953, the slide again raised the roadway surface 14 in. and a 3-ft. crack formed near the head of the

(Continued on page 94)

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hangs on to heavy loads — doesn't hesitate a bit!"

says FREDERICK VOLK, Fox Point, Wis.

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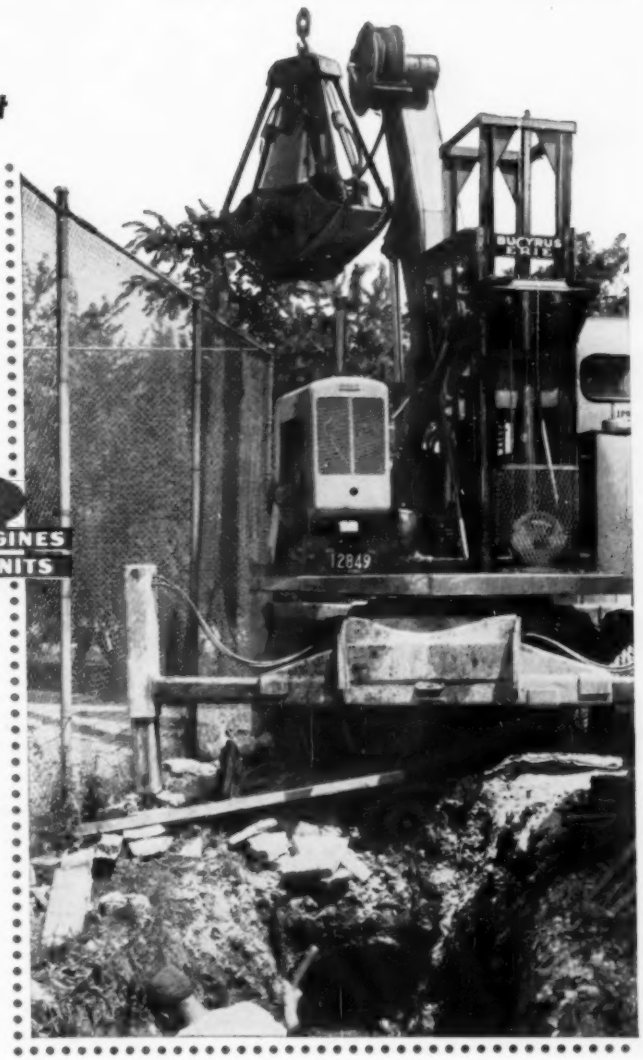

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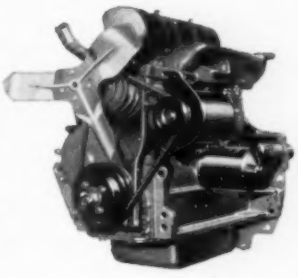

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. . . for more details circle 199, page 16

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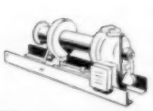

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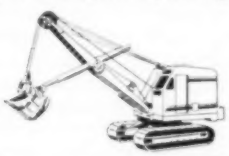

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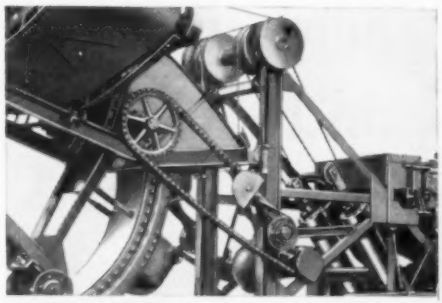
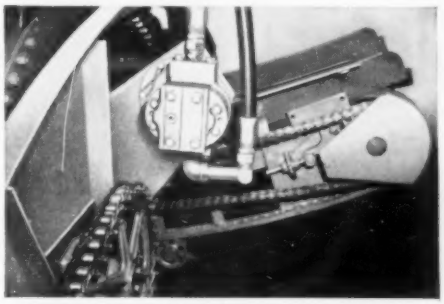
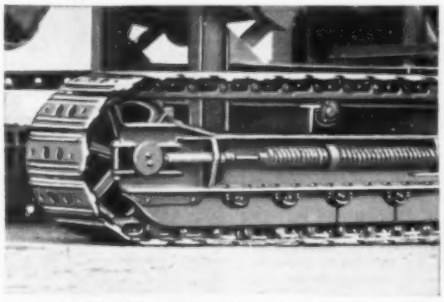


LIVE HYDRAULIC WHEEL HOIST positions digging wheel faster, more accurately. Digging wheel is positioned independently of all other operations. Operated from seat by simple, one-hand controls.



HYDRAULIC CONVEYOR DRIVE eliminates shock damage . . . requires less maintenance. Three discharge speeds in either direction meet any conveyor need. Completely controllable from the seat.



TRACTOR-TYPE CRAWLERS, with face-type roller seals, give long, trouble-free service life. Simplifies variation in tread width and bearing areas through a selection of pads for any type digging.

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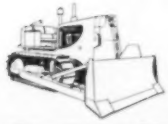


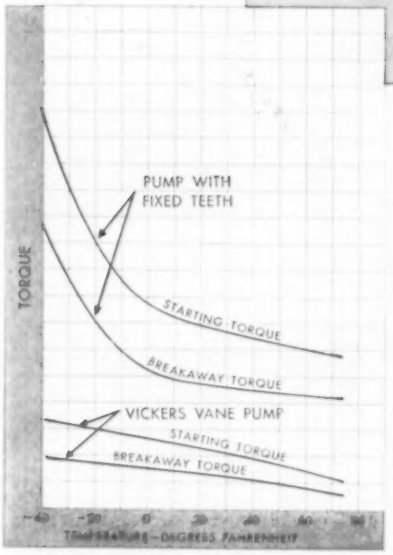
Gar Wood Tractor Equipment

Gar Wood-St. Paul Hoists & Bodies

. . . for more details circle 204, page 16

MUCH EASIER COLD WEATHER STARTING

Sno-Cat (without body) undergoing tests in extreme cold in the Pyrenees mountains preparatory to being used by French scientific expedition at the South Pole. Sno-Cats will also be used by the U.S. Navy and British Expeditions to the Antarctic.



Curves based on comparative tests of a Vickers Balanced Vane Type Pump and an equal capacity pump with fixed teeth. Oil used in both was SAE 10W premium grade.

Another Reason Why

TUCKER SNO-CATS have

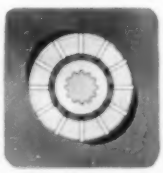
VICKERS® Balanced Vane Pumps

The Sno-Cat operates where it is really cold . . . high in the mountains . . . with U. S. Navy, French and British Expeditions in the bitter wastes of the Antarctic . . . wherever snow is so deep that wheel vehicles fail.

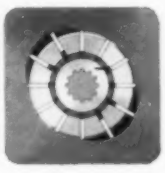
Like many other vehicles that must operate in cold weather, the Sno-Cat uses a Vickers Vane Pump to avoid the extra starting handicap that would be imposed by a hydraulic pump with fixed teeth or spring-extended vanes. In extremely low temperatures such a pump seriously increases starting load over normal (see curves at left) . . . at a time when the cold has substantially reduced the power of the starting battery. The diagrams below at the left show why Vickers Vane Pumps provide much easier cold weather starting.

All Tucker Sno-Cats use a Vickers hydraulic power steering system. In addition to the pump, these systems include a steering booster, a volume control, and overload relief valve.

Any vehicle which must operate in cold weather needs a hydraulic pump that provides "no-load starting". Let us tell you more about it . . . and about the many other reasons for using Vickers Balanced Vane Pumps.



Schematic diagram of Vickers Balanced Vane Type Pump showing how sliding vanes are retracted at normal engine cranking speeds. No oil is pumped and there is practically no starting load.



Similar diagram shows how pump vanes are extended when engine fires. Pumping then begins and continues at all engine speeds (vanes are held in intimate contact with cam ring by system pressure in addition to centrifugal force).

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. . . for more details circle 267, page 16

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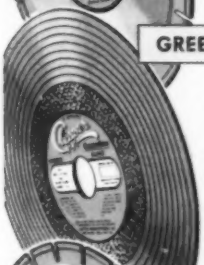

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. . . for more details circle 191, page 16

(Continued from page 88)

slide filling up with water within 12 in. of the surface. This happened during a period of no precipitation, so it was evident the crack extended down to an underground flow under pressure. It was decided to attempt to intercept and drain this flow by means of horizontal drains drilled from the roadway ditch. Four holes totaling 832 ft. were drilled during November 1953, and casing was inserted for the full length. All drains produced water. The initial flow from hole 3 (232 ft. long) was 21,600 gal./day for two weeks and then leveled off to 17,000 gal./day. The drains are still flowing substantial amounts of water and the slide has shown no further signs of movement.

A sample of this slide material shows a Liquid Limit of 99, a Plasticity Index of 79, and a moisture content of 34. It is not apt to be dried up very quickly by the drains. But lubrication of the slip plane, horizontal pressure by water-filled seams and hydrostatic uplift can undoubtedly be strongly reduced by such drainage.

● *Fifth Example.* Another fill slide was treated in a somewhat different manner from the others. This fill was constructed of material taken from the cut which had a liquid limit of 99 and a plasticity index of 79 so it could not be expected to be very stable when wet. Several vertical auger holes beyond the toe of the fill showed free water standing at depths of 13 to 20 ft. Accordingly, a 20-ft. open trench was dug parallel to the road 50 ft. from the shoulder line. This trench was backfilled with gravel and three drains were then drilled under the fill through this gravel-filled trench. The first two of these drains carried an average of 10,000 gal./day each, decreasing to 5,000 gal./day after 10 days; the third drain carried 500 gal./day. The portion of the slide-out was rebuilt with granular material and is apparently stabilized. The drains are continuing to flow strongly.

On a project constructed along the Snake River south of Jackson a fill has shown continual settlement since completion in 1953. This section of road traverses an old slide area extending from several hundred yards uphill to the edge of the Snake River where typical slide topography occurs. Test pits were dug in 1953, in the natural ground at the toes of the fill but no free water was encountered. The foundation material for the fill was found to be a wet, plastic clay mixed with rocks so during 1954, seven horizontal drains were drilled in an effort to stop further fill subsidence. Three drains drilled above the fill intercepted very little free water while only one of the drains drilled under the fill intercepted any water. That drain struck an initial flow of 30,000 gal./day which decreased to 15,000 gal./day. We doubt that the foundation is adequately stabilized, however, and plan some additional drilled drains this year.

During 1954, we drilled horizontal drains totaling 1,050 ft. in unstable cut banks on the Zion-Bryce Canyon National Parks Approach Road in Utah. At this location, several springs occurred on the face of a high cut bank, causing it to slide. Five drains were drilled in an effort to intercept these springs. Two of the drains were drilled from a side canyon in a direction parallel to and at a distance of 20 to 30 ft. back from the face of the

● Another view of typical drilling operation.

- We still haven't reached the point where slides can be predicted consistently.
- Very little increase in the stability of a slope often will obviate slides.
- Drainage is generally the key to stabilization.
- Costs are determined largely by nature of material and accessibility of site.
- No highly specialized equipment required — special attachments to existing equipment successfully used.
- When ground water could be located the drilled-horizontal-drain method has proved most successful in slide stabilization.

● Over 22,000 gal. daily flow was obtained from this successfully drained site; station 662, Yellowstone South Approach Road, Wyoming.

● Bulldozer aided in moving equipment, clearing brush, etc., in connection with drilling operation.

cut. The other drains were drilled diagonally back towards the seepage areas, starting from the face of the cut. All five drains carried good flows of water varying from 1,500 to 8,500 gal./day. In the 1955 spring season they continued to flow strongly and the cut face appeared to be dry and stable.

● *Costs.* Most of the costs with an operation of this kind are fixed — salaries, expenses, and equipment rental—so the unit costs will depend largely on the rate of progress, which in turn depends on the nature of the material being drilled and the accessibility of the drilling site.

Our costs dropped from $4.55 per ft. of drilling and $5.28 per ft. of casing installed in 1953, with 87 percent of the 3,387 ft. of drains cased; to $4.34 per ft. of drilling and $3.95 per ft. of casing for 2,797 ft. of drains 100 percent cased in 1954.

● *Colorado Data.* During the 1955 season we drilled some drains on the Willow Creek Pass project and about 2,500 ft. drains on the Marvine-Phippsburg project, both in Colorado. It appears now that our costs for this work are substantially lower for the previous years. Much of this lower cost can be attributed to an easier drilling material, but some must be attributed to the greater proficiency of the crew and improvement in the equipment. It should be mentioned that our drilling crew does not spend all of its time drilling horizontal drains, as that is just one of its activities.

● *Basic equipment* for horizontal drilling consists of the following:

1. Core drill with N-2 hydraulic swivel head.

2. NX drill rod in 5- and 10-ft. lengths in sufficient quantity to go full depth of holes drilled, at least 350 ft.

3. Both cone-type rock bits and finger or drag bits. The latter are used in soils and shales and the rock bits wherever much rock — loose or solid — is encountered.

4. A high-pressure mud pump.

5. A small bulldozer to build trails into off-the-road drilling sites, move the equipment around, and dig sumps for the drilling water.

6. Necessary trucks to transport the equipment and haul water for drilling when necessary.

Summarizing our experience to date, we are convinced drilled horizontal drains is the only feasible method of stabilizing some slides. Under favorable conditions, drains can be installed by this method at considerably less cost and drains can be installed in locations not adaptable to other methods. We have not had 100 percent success, but we attribute this more to our guesses as to the location of water rather than to any fundamental defect in the method. Where the drains have carried the most water, the slides have been effectively stabilized.

● Hole No. 3 in slide area along Togwotee Pass Road, Wyoming. Flowing 8,600 gal. per day.

As long as we build roads in wet steep slopes, and subsurface water flows occur, we can expect to have slide problems. We are convinced that, under such conditions, drilled horizontal drains offer the best and cheapest method of stabilization.

Research in limestone screenings in Kansas

A cooperative research project has been initiated by the Kansas Highway Commission to find a roadbuilding use for the huge piles of screenings from limestone-crushing operations.

The State Geological Survey of the University of Kansas, the engineering and geology departments of Kansas State College, the research and geology sections of the Highway Commission, and the Kansas Limestone Association, will pool their efforts to find a use for this undersized material, piled high at most crushers in the eastern third of the state.

During the 1930's and late 1940's, this material was used as agricultural lime but the federal support program which sponsored this has been curtailed.

About 30 percent of the screening production goes into waste piles. At first glance, this looks like only a problem for the crusher owners, but in the last few years there has been a serious decline in the supply of aggregate which meets commission specifications for construction material. The situation exists not only in Kansas but in other midwestern states as well.

Shipping charges for aggregate, further notes a commission spokesman, will increase the cost of future highways a great deal unless economic methods can be found to use material now considered inferior or worthless.

The first step in the research will be to correlate all of the information which the four agencies now have. The producers will furnish a list of the locations of these screening piles. Each of the other groups already has run tests at many sites but each for a different purpose. The highway commission has run physical tests to determine whether it would be suitable as aggregate. The Geological Survey has made chemical analysis at many of these places and Kansas State College has made other studies.

The Geological Survey will correlate all of this material and determine whether additional tests may be necessary at some of the quarries.

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. . . for more details circle 263, page 16

Repairs Shorten Work Hours of Dump Trucks

WHAT it costs in terms of job delays as well as dollars to keep dump trucks in repair on highway bituminous surfacing jobs, is revealed in recent studies made with stop watches. The investigation is part of the program conducted by engineers in the Bureau of Public Roads, working under a special committee on highway equipment in the Highway Research Board.

As reviewed in committee report No. 27 of the Board, the studies involved a single-unit dump trucks covering a period equivalent to one truck working 2,680 ten-hour work shifts. Data on maintenance and repair of the trucks are as follows:

1. An average of 1.7 hours was lost per truck out of each 10-hour work day, because of major delays for maintenance and repairs. (A major delay was any delay involving time loss of more than 15 minutes.) Delays of this source accounted for ⅙ of all delays during otherwise available working time. Weather delays were not counted.

2. An average of $7.90 in maintenance and repair cost, not counting labor, was recorded for each scheduled 10-hour work day on the average. This was the equivalent of $17.50 per 1,000 ton-miles of hauling.

3. The 1.7 hours lost per 10-hour truck day involved 1.75 man-hours of labor for performing the needed maintenance or repairs, or equivalent to 3.8 man-hours per 1,000 ton-miles of hauling.

4. No correlation could be found between the duration of delay and the cost of repair. For example, tire trouble accounted for only 6% of all delay time, but tire and tube replacement alone accounted for 37% of the yearly average cost of maintenance and repair, or $2.92 per 10-hour truck day of operation.

The foregoing conclusions were obtained from studies made in 1952 and 1953, covering 159 different dump trucks used for hauling base surface course material on four highway bituminous surfacing jobs.

Some of the trucks were new, others ranged up to 12 years old, the average truck being in its third year of use. Trucks ranged in capacity from 2.7 to 5.2 cu. yd., without sideboards; and average loads hauled varied from 4.5 to 8.2 tons, but were not in direct relation to capacity. The load-capacity ratio varied by job from 1.4 to 1.9 tons per cu. yd. of truck capacity.

Thruway cuts trucking cost

Important new data on the operating economy represented by a modern toll turnpike compared with ordinary intercity highways was developed recently by tests on the New York Thruway.

Tests of economies of operation were made by the General Electric Company and Riss and Company, Inc., of Kansas City, Mo., one of the nation's largest regular route motor carriers, as well as by several other smaller truck users.

The General Electric tests were made with identical equipment between the company plant at Schnectady and Williamsville on the outskirts of Buffalo. Deliveries over the thruway on round-trip tests showed a saving of 38 miles and a drop in fuel consumption of 14.2 gallons compared with the toll-free route. In addition the company reported, drivers using the thruway had to shift gears 298 times less than on the regular highway. And they saved 142 brake applications and 69 full stops. On the round-trip, trucks using the thruway saved 4 hrs. and 29 min. and averaged 10.64 miles-per-hour faster than on parallel highways previously used.

This type of data, observed B. D. Tallamy, chairman of the New York Thruway Authority, is the underlying reason for the rapid rise in the use of the thruway by trucking interests in recent weeks.

Major Delays for Truck Maintenance and Repair

Percentage Distribution and Average Duration of Delays

Type of delay	Percentage distribution of all time lost in major delays due to maintenance and repair	Hours of working time lost by the average truck during each individual delay occurrence
Motor	21	2.9
Wrecks	18	96.4
Overhauls	14	48.8
Clutch, transmission, drive shaft, axle, and rear end	14	6.7
Dump bed and dump mechanism	7	3.4
Tires	6	1.4
Brakes	6	2.6
Grease, change oil, wash	6	1.2
All other (front end, steering, springs, frame, and body)	8	3.5
TOTAL	100	

Thruway bridge insurance of $64 million sought

The newly completed $78 million bridge over the Hudson River, part of the New York State Thruway, will be insured for $62,400,000 if such coverage is obtainable, according to thruway officials.

The State Division of Standards and Purchases, negotiating for the insurance, estimated that the premiums would cost about $100,000 per year. The policy would be an all-risk one, covering physical damage and use and occupancy provisions. The Thruway Authority could collect up to $6 million annually as reimbursement for lost tolls, in the event that the bridge was closed because of ice jams or other accidents.

80-Mile toll-free expressway in N. Carolina

Another link has been completed in an 80-mile continuous toll-free expressway in N. Carolina. Stemming from the Yadkin River to Hillsboro on U. S. routes 29 and 70, the highway is proclaimed by the N. Carolina Highway officials as the longest such free expressway in the South.

The expressway compares with modern toll roads in design, in that it is 4-lane divided, by-passes all towns and is without speed restriction zones or stop lights. The 4-lane divided pavement has been completed for 55 miles, with right-of-way acquired for the second roadway for the remaining distance. Along the route signs read "Limited Access Highway Entrance Driveway by Permit Only from the State Highway Commission."

DIGEST of Current Engineering Literature

By JOHN C. BLACK, Associate Editor

Contour maps by aerial photography

In a brief review of the purposes, methods, and history of aerial surveying and photogrammetry, the author comments as follows on the character and accuracy of contour maps: "The state highway departments of at least 30 states now locate and in many cases design their highways from photogrammetric maps. The most usual practice is to start out with aerial photography along the proposed routes at a scale of perhaps 1 in. = 1,000 ft. With this photography and correlating ground studies, the probable center line of the highway is located. Then a topographic map is prepared from the same pictures at a scale of 1 in. = 200 ft., with 5-ft. contours. This is often followed by a subsequent flight at a larger scale, such as 1 in. = 50 ft., with 2-ft. contours. These maps are frequently accepted by both the state and the contractor as the basis for quantity payments, and for estimating purposes."

Since ground visibility is an obvious necessity for accurate contour location, areas of dense evergreen growth require supplementary ground work for mapping. Same is true for certain kinds of brush. Deciduous forests generally present no obstacle to aerial surveys in the winter, when leaves are gone.

Railway line inventories, and "perpetual inventories" of material stock piles (both cheap and simple) are among other uses noted for aerial methods.

"Photogrammetry at your Service" by Leon T. Eliel, President Fairchild Aerial Surveys, Inc., Los Angeles, Calif., CIVIL ENGINEERING, *33 West 39th St., New York 18, N. Y., October, 1955. (Price 50c per copy)*

Three articles on signals and pedestrian crossings

A large panel signal showing a green WALK and a red DON'T WALK was installed last April at Seventh Ave. and Thirty-fourth Street in downtown Manhattan. It has met wide-spread approval, and 36 similar signals will be placed at other locations in an initial program. Construction of the signal and the method by which brilliant, clear-cut, and properly proportioned letters are attained are described. Twelve seconds before the end of a walking period, the signal flashes DON'T WALK at a rate of 60 flashes per minute; otherwise the lights are steady.

At Hammond, Indiana, an experiment has been tried in changing "WALK" to "LEAVE CURB," and "DON'T WALK" to "DON'T LEAVE CURB," the idea being that pedestrians can be controlled only at the curb. Again, results have been gratifying; there is less confusion. The following accomplishments are cited:

1. Controls the pedestrian before he enters the street.
2. Eliminates gutter standing.
3. Does not say anything to pedestrian after he has left the curb.
4. Eliminates criticism from the pedestrians.
5. Eliminates the contact of pedestrian and police officer.
6. Can be worked into any existing system by the changing of the neon tube or incandescent mask.

A discussion of school crossing problems is presented from Chicago. Methods of data collection and analysis (mostly along established and well-recognized lines) are stated, and means of protection discussed. Stress is laid on the thought that children should be taught as well as protected; every child meets occasions when it will, or must, cross without protection. Patrols, adult guards, police, signs, signals, and pavement markings are all considered. Complete standardization of signs is urged. Impractical or unfavorable driving regulations are condemned.

"The Lawton Pedestrian Signal" by Lawrence Lawton, Director of Traffic Planning, Department of Traffic, City of New York.

"Pedestrian Signal" by Lawrence Hoffman, City Traffic Engineer, Hammond, Ind.

"School Crossing Protection" by Matthew C. Sielski, Director, Safety and Traffic Engineering Department, Chicago Motor Club, Chicago, Ill.

TRAFFIC ENGINEERING, *Strathcona Hall, New Haven 11, Conn., September, 1955.*

Construction equipment reviewed with sketches

Sixty individual equipment units are shown in sixuple line drawings — 49 modern — 11 prototype or of transition period. Subjects range from a simple drill to a 60-yard stripping shovel. Most of the modern items carry manufacturer's name and current price. Sketches are arranged in groups — scrapers, loaders, paving equipment, etc.

Text of the article is a broad running commentary — partly historical, partly enlogistic, and briefly economic. Equipment selection is treated as "an art," with basic elements noted.

In a second section the author discusses an aggregate and concrete plant for a large dam. Flow lines for material are sketched and a general diagram shown for a batching and mixing plant of 240 cu. yd. per hour capacity. Crushers, conveyors, and other units are indicated and priced.

"A Construction Engineer Talks about the Tools of the Trade" by J. G. Tripp, Consulting Civil Engineer, CIVIL ENGINEERING, *33 West 39th St., New York 18, N. Y., October, 1955. (Price 50c per copy)*

Little shells in big job

Though oyster shell is no novelty in road building, the scale and certain details of its use in the Navy's Alvin Callender Air Base now being built by Blyth Brothers Company and Morrison-Knudsen Company, Inc. near New Orleans are worth noting.

The "floating fill" on which the base is located is a blended and compacted mixture of 450,000 cu. yd. of shells and 1,500,000 cu. yd. of sand, the former dredged from the Gulf of Mexico and hauled to the job in barges, the sand dredged from the Mississippi River and pumped through 2 miles of pipe to a 90-acre stock pile.

"Alvin Callender is a hard-won triumph over unstable ground. It is growing in a low-lying, forested swamp area where the soil consists of soft clay that extends 1,800 ft. downward before it reaches solid material. Atop the deep bed of clay is a 1- to 3-ft. blanket of the decayed organic matter known locally as 'coffee grounds.'

"To wrest the new base from this

tough terrain, the Blythe-M-K constructors first cleared the heavy forest growth from 1,127 acres. Draglines then stripped off 440,000 cu. yd. of 'coffee grounds' in the runway and taxi-way areas, working from timber mats that kept the big rigs from sinking into the mud-like clay. Since trucks could not enter the boggy work areas to haul away the decayed material, it was cast to either side and allowed to dry for six months before it was dressed off by bulldozers.

"With the clay thus stripped bare of its covering of 'coffee grounds,' the base builders pitched into the big task of constructing the runway and taxiway fills. First the clay was covered with a layer of sand at least 2 ft. thick. To speed settlement, the fills were weighted down with extra sand that later was stripped off to the finished grades. Atop the fills was placed a base course of sand and oyster shells, mixed by disc harrows and compacted by heavy rollers to meet Navy specifications."

Necessary under-drainage extends to 10 ft. below sea-level.

Large scale, pertinent illustrations are a valuable feature of the article.

"Air Base Built on Oyster Shells," The Em-Kayan, Morrison-Knudsen Company, Inc., 319 Broadway, Boise, Idaho, January, 1956.

Expansion and dummy joints in Holland

Dutch roads are notable for a uniformly high standard of construction. Concrete slab design is based almost entirely on experience, with techniques of construction very highly developed.

Local conditions require extreme attention to subgrades. Excavation of subsoil and replacement with sand often are necessary. "Good drainage of the base is considered to be of the greatest importance. A layer of sand some 3 ft. thick is *always* laid beneath the pavement as a sub-base and for drainage purposes, and the crown of the road must be at least 3 ft. 6 in. and preferably 5 ft. above the water table to avoid frost damage."

Slabs are 9 in. thick, 12 ft. wide, and 80 or 125 ft. long, the shorter ones being laid in winter and the longer in warm weather. "The slabs are separated by expansion joints, and dummy contraction joints occur at 20 ft. 6 in. intervals: as the carriageways are 24 ft. wide, two slabs with a longitudinal joint between them are laid in each carriageway. The slabs are provided with tie-bars of approximately ¾ in. diameter (which are covered with asphalt for 4 in. to each side of the joint) at a depth of 5.3 in. through both contraction and longitudinal joints, and the concrete is placed in two courses, a top course 2.3 in. thick and a bottom course 6.7 in. thick.

"The expansion joints are 0.5 to 0.6 in. wide and are made over a concrete sleeper beam. . . . These beams are made with great care and are given a double coating of an asphaltic emulsion to lessen the friction between slabs and beam."

"It is regarded as very important that the beams should be wide enough to spread the load over a fairly large surface, and a width of 4 ft. is specified. Experience with this construction over a period of 14 years has been very satisfactory and no damage of any importance has occurred at joints where sleeper beams have been used.

"During the placing of the bottom course of the concrete an inverted box is placed on the sleeper beam, just over the location of the expansion joint. When the course has been spread the box is removed and vertical bars are then placed in holes, previously made for the purpose in the sleeper beams, just behind the line of the joint, and against this is placed a soft wooden joint filler topped by a lath 1 in. deep. Concrete is then placed on both sides of the wooden filler and compacted with a vibratory compactor worked by hand, and then, finally, the top course of concrete is placed and compacted. The wooden lath in the top part of the joint is left in position until the sides of the joint are to be coated with primer. The day's work has always to end at an expansion joint if possible or, if not, at a dummy joint beneath which a sleeper beam has been specially placed.

"Joint sealing compound is poured into both expansion and longitudinal joints one or two hours after the primer has been applied. During the last few years a rubber-bitumen compound has been used for joint-sealing with very satisfactory results.

"The contraction joints are 2-4 in. deep and about 0-06 in. wide, and they are made as soon as the top course of concrete has been compacted. A jointing tool or knife is vibrated vertically into the concrete and withdrawn, and then inserted once more into the concrete with a strip of 'Ruberoid' wrapped around it: the tool is then withdrawn, leaving the joint filler sticking up above the road surface. After the concrete is finished the joint has a width of as little as 0-08 in. The next day the projecting 'Ruberoid' and any surplus mortar are scraped off."

"Modern Methods of Motorway Construction in Holland." (Notes based on a paper given by Ir. J. C. N. Ringeling, Chief Engineer of the Netherlands Department of Waterways and Roads, before the British Cement and Concrete Association) Concrete Quarterly, *52 Grosvenor Gardens S. W. 1, London, July-September, 1955.*

Incentive to efficiency

The subtile effect of incentive on returns from the highway wage and salary dollar, the nature and major bases of incentive, and practical means for developing it are discussed at length.

Pay is important, and we all want it *big*, but pay alone produces only ordinary results. Anything greater requires enthusiasm and *super* effort — personal factors which wise administration can induce.

Let a few quotes indicate the author's approach.

"Incentive management seeks to produce more — with less effort — and do it safely. It goes beyond the product, concerning itself with those who create the product, recognizing their right to a wholesome and happy condition in the process of production, and their right to and need for a just pride in the result of their labors."

"A man not only likes to do a good job, but likes it expected of him."

"What is it that converts a group of individuals into a team? Team spirit, and what does team spirit exist on? Primarily, on the feeling of belonging."

"Fellow Highway Folks, I am talking to you about something more important by far than even the building of highways. I am talking to you about proper human relations. But please note that when we apply proper human relations, there results not less work done but more work done. Not fewer highways, but more and better highways."

Beside the outlines of various methods and procedures in the relations field, there is a detailed statement of the organization of the incentive management program within the Virginia Department of Highways. The direct administrative unit is the residency.

"How the Incentive Management Program Operates in a State Highway Department" by C. W. Kestner, District Engineer, Virginia Department of Highways, Culpepper, Virginia. A paper presented at the Purdue University Road School, 1955, and published in the Proceedings, *September, 1955,* Engineering Bulletin Extension Series No. 88, *Purdue University, Lafayette, Indiana.*

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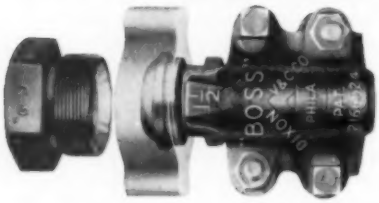

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. . . for more details circle 274, page 16

Stepped and flat slab column footings

Report of tests at the University of Kansas includes descriptions, "crack and steel diagrams" of 12 footings tested to practical failure, tabular matter, and conclusions as stated in the author's synopsis below.

"Thirty-two 18-in. square model footings were tested at the University of Kansas. Each was supported during the test on actual soil. Twenty of these were stepped footings having top block widths varying from 35% to 55% of the base width.

The projection of the top block beyond the column was made equal to the thickness of the top block. Allowable shear as a measure of diagonal tension was the basis for the determination of effective depth. Reinforcement was No. 9 galvanized wire having a proportional limit stress of 37,600 psi. The bond resistance of this wire was satisfactory, being decidedly higher than plain rolled bars, although much less than high-bond deformed bars.

"These observations appear to be particularly significant:

1. All failures were by tension, or by tension and bond, the steel stresses being above the proportional limit or bond stresses above 0.1 f'_c in all but four cases. These stresses were at practical failure, not ultimate, and were calculated according to the current ACI Building Code.

2. The vertical plane at the face of the top block was usually the critical section in the stepped footings.

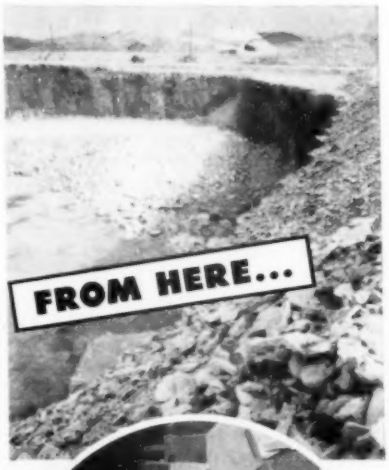
3. Diagonal tension was not critical in any of these footings, in spite of shear intensities as high as 0.089 f'_c.

"This conclusion is suggested:

Given footings designed as stated above, a stepped type having top block width half that of the base will require less material yet support a greater load than will a flat slab type, all other factors being the same."

"The Relative Performance and Economy of Stepped and Flat Slab Single Column Footings" by Clayton M. Crosier, Associate Professor of Civil Engineering, School of Engineering and Architecture, University of Kansas, UNIVERSITY OF KANSAS PUBLICATIONS, THE BULLETIN OF ENGINEERING AND ARCHITECTURE No. 33, *Lawrence, Kansas, 1955. (This bulletin includes two other papers — "Review of Footing Action and Investigations" and "Plain Concrete Footings, Reprinted with Some Changes from The Kansas Engineer," January, 1949.)*

Best Route:



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. . . for more details circle 276, page 16

New Publications

THE RIGHT WORD. This is the title of a little booklet, a glossary of highway terms written for better understanding on the part of both engineers and the public of what is meant by such terms as "Arterial Highway" through to "Vehicle Mile." For copy, please write National Highway Users Conference, National Press Building, Washington 4, D.C.

ALTERING SOIL PROPERTIES WITH CHEMICALS. A symposium on this subject held at the 127th annual meeting of the American Chemical Society, Industrial and Engineering Chemical Division, has been published. This 2-page bound volume is available at $1.50 by writing Industrial and Engineering Chemistry, 1155 — 16th Street, N. W., Washington 6, D. C.

MANPOWER NEEDS IN HIGHWAY ENGINEERING, Bulletin 106, Highway Research Board, 2101 Constitution Avenue, Washington 25, D.C., contains articles on subject presented at annual meeting of the Board, January, 1955.

A GLOSSARY OF TERMS, intended for use as a standard reference as to terminology in connection with hydraulic hoist and steel dump body manufacturing operations has also been compiled and published by the Engineering and Technical Committee of this TBEA Industry Division.

The Hydraulic Hoist and Steel Dump Body Manufacturers Association, an independent trade association, recently discontinued its activities as such, and its members are now affiliated with the Truck Body and Equipment Association, comprising the Industry Division referred to above.

FINANCING MODERN HIGHWAYS FOR MICHIGAN, by Richard M. Zettel, Economic Consultant, assisted by Richard R. Carll, Highway Economist. A fiscal report to the Michigan Legislative Highway Study Committee, this 128-page booklet contains exhaustive data on highway needs, financial resources, appraisal of current road financing, who should pay, and recommendations for future road financing.

FOOTING. Study of stepped concrete footings by Clayton M. Crosier. Report on research on this subject, Bulletin of Engineering and Architecture, No. 3, University of Kansas Publications, Lawrence, Kansas.

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Dietz does it . . . for pennies per day!

Here is the most complete line of long-burning kerosene lanterns and torches on the market.

Here is *dependable* night-long protection for drivers . . . for pedestrians . . . and for *you*!

● **Ask your safety lighting man to take a good look at the *DIETZ* line of safety lanterns and torches, at your distributor's or hardware dealer's. R. E. DIETZ COMPANY, 102 Leavenworth Ave., Syracuse 1, New York.**

DIETZ

OVER A CENTURY OF SAFETY LIGHTING

. . . for more details circle 194, page 16

ROADSIDE VEGETATIVE COVER. Final report of research project on this subject, issued by the Landscape Bureau, New York State Department of Public Works. For copy, address Nelson M. Wells, Director of the bureau at Albany, N.Y.

This 52-page illustrated bulletin reviews findings of a project under supervision of Harry H. Iurka, in conjunction with Cornell University and Rutgers University, aided by a score of consultants. Representing one of the most ambitious and complete studies ever made of roadside vegetative cover, the report contains chapters on the climate factor, soil, plants, design, construction, maintenance, equipment and other topics.

The research was financed by joint appropriations from New York State Department of Public Works and the Bureau of Public Roads.

SIGNIFICANCE OF TESTS AND PROPERTIES OF CONCRETE AND CONCRETE AGGREGATES. Special technical Bulletin No. 169, American Society of Testing Materials, 1916 Race Street, Philadelphia 3, Pa., price $5.25 (or to ASTM members $4.00).

This third edition, about 400 pages, heavy paper cover, 6″x9″, is greatly expanded over previous editions; includes not only the latest views on the significance of *tests*, but also the significance of *properties* of concrete and concrete aggregates. The papers constitute a review of the present status of the technology, written by leaders in their fields.

The book will be useful to engineers and executives not expert in research and testing, but who are responsible for concrete construction and must know what tests are required for adequate job control and results. It is recommended as an excellent text or text supplement for students.

Replacing previous reports on this subject, the book is sponsored by Committee C-9 on concrete and concrete aggregates of ASTM.

Weather data available on New York Thruway

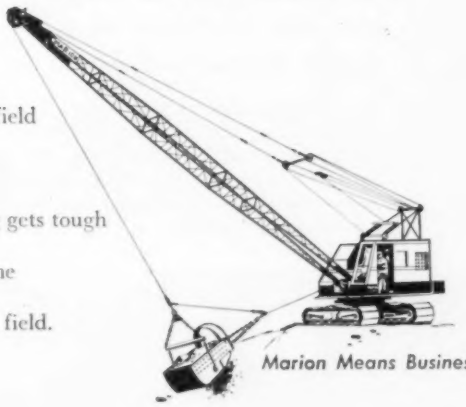
The New York Thruway Authority is experimenting with recorded weather reports on road conditions. Motorists may call a number and receive a complete report on driving conditions for the entire 427 miles of the thruway from Buffalo to Yonkers.

The number is connected to an answering device which will be changed by thruway personnel as conditions alter. Latest reports will be made available.

Duration of the test period was not announced.

champions in their field . . .

Point! Flush! Retrieve! You thrill to the brilliant field work of an experienced Irish Setter. A glance tells you his sure-footed poise and his stamina when the going gets tough are the marks of a true champion. You'll recognize these same qualities in Marion's one-yard 43-M, a champion in its field.



Marion Means Business

MARION POWER SHOVEL COMPANY, MARION, OHIO

. . . for more details circle 231, page 16

ROADBUILDERS! HOW

New SEAMAN-ANDWALL TRAV-L-PLANT COMPLETES 22-FOOT BITUMINOUS ROAD BASE AT MILE-A-DAY RATE

New speed in road building is announced by the Seaman-Andwall Corporation, which now offers a complete line of equipment for stabilized road construction. Roadbuilders who have been interviewed state that Seaman-Andwall Sta-Bilt equipment provides better, more durable bituminous roads at lower cost with greater strength, higher densities — built at a mile-a-day production rate.

Much of the credit for this road building speed-up is given to new versatility built into the Seaman Trav-L-Plant, a double-duty and often triple-duty machine that performs "in-place" mixing and binder application together with light scarification in one time-saving simultaneous operation.

Not only is the TRAV-L-PLANT used for new bituminous road construction, but it is widely accepted as fast, economical equipment in reconstruction of old, worn out bituminous roads. In such work the TRAV-L-PLANT as it mixes, quickly reduces the previously scarified material to original aggregate size ready for compaction.

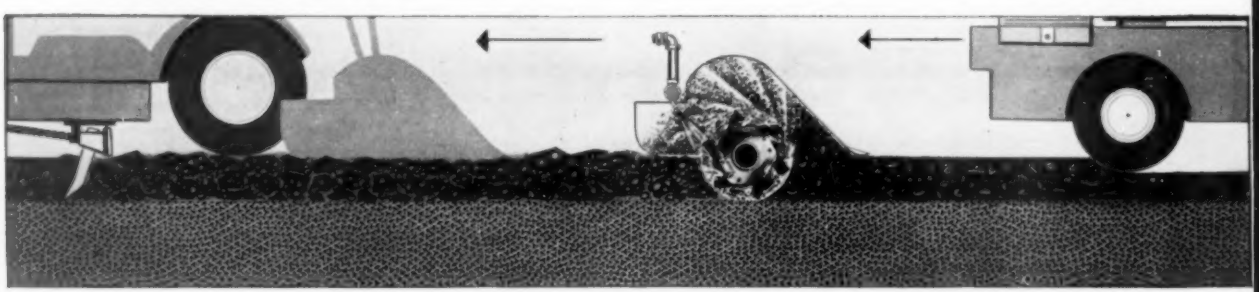
The basic operation of the Seaman equipment is that of soil stabilization — the "in-place" mixing, blending and assembly of the base materials. It thoroughly mixes the fines and coarse materials so that voids are filled, and larger aggregates are interlocked and securely mortared-in by the fines. The mix compacts to higher, much higher, densities for greater load bearing value, longer wear and much lower maintenance.

The TRAV-L-PLANT pumps binder into the mix from a transport truck operating at the side or ahead. Full tachometer assemblies and volumetric meter provide precision application through a spray bar positioned in the mixing chamber. Binder is applied directly into the mix. Because there is no time delay between base stabilization and binder application and mixing, the bitumen has no time to cool before it's in the mix. Run-off or migration is also entirely prevented.

Above — Seaman Self-Propelled TRAV-L-PLANT in bituminous parkway construction, Jacksonville, Fla. Binder is pumped from transport ahead of the Seaman.

Sta-Bilt Method of Road Stabilization

The Seaman-Andwall TRAV-L-PLANT scarifies old bituminous material; the rotor reduces the lumps to original aggregate size and, simultaneously, new binder is applied through spray bar mounted just ahead of the rotor. Compaction follows immediately after the TRAV-L-PLANT has completed its operation.

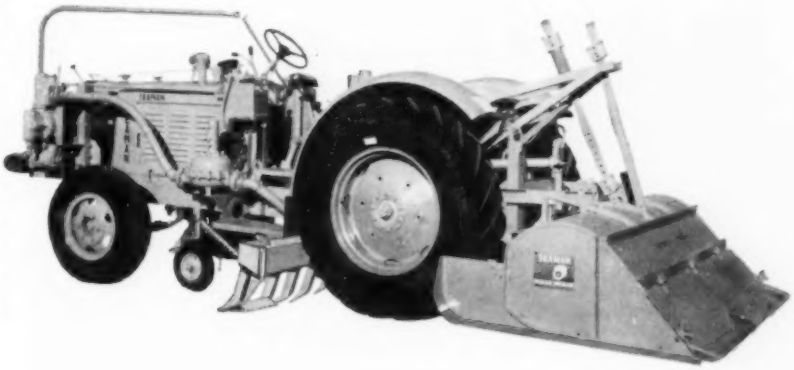


TO BEAT THE CLOCK...

The TRAV-L-PLANT leaves the surface partially compacted, ready for final rolling, an operation further improved by the new Seaman-Andwall compactor. These rollers offered in steel wheel and pneumatic models apply power to the *front* rolls. This produces a "straight down" pressure which eliminates shoving, shearing, scuffing and tearing of the surface which is so often the case with rear drive rollers. By this principle the task of compaction is correctly accomplished in much less time, and with fewer trips to attain specified density.

SEAMAN TRAV-L-PLANT

Today's most versatile road-building machine. Equipped with pump tachometer assemblies, volumetric meter, spray bar to apply bitumen or water simultaneously with mixing-in-place operations. Also available with new UNDERBODY SCARIFIER — for extra versatility.

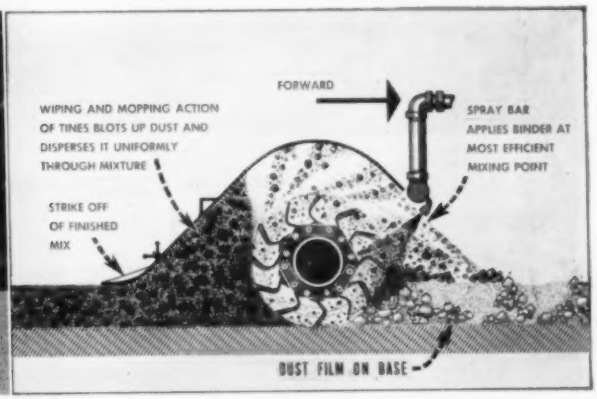


NEW S-A UNDERBODY SCARIFIER

Mounted between rear and front wheels of the TRAV-L-PLANT, this unique new Scarifier Attachment can often be used for light scarification and frequently in the same operation with mixing and binder application, depending on conditions. Easily attached, it adds one more operation to the TRAV-L-PLANT efficiency.

S-A SPRAY BAR AND MIXING CHAMBER

Illustration shows location of spray bar just ahead of tines on TRAV-L-PLANT. Binder is instantly mixed without any opportunity for run-off or migration. Notice blending of fines and coarse with aggregates interlocked to correct segregation.


FORWARD
WIPING AND MOPPING ACTION OF TINES BLOTS UP DUST AND DISPERSES IT UNIFORMLY THROUGH MIXTURE
SPRAY BAR APPLIES BINDER AT MOST EFFICIENT MIXING POINT
STRIKE OFF OF FINISHED MIX
DUST FILM ON BASE

Stabilizing the World

GET THE FACTS!

Write for Bulletin TPS-B-34 "SEAMAN METHOD OF BITUMINOUS STABILIZATION"

SEAMAN-ANDWALL CORPORATION

291 North 25th Street • Milwaukee 1, Wisconsin

. . . for more details circle 237, page 16

What's New
in Equipment and Materials

Reader Service Coupon on Page 16

OTC 100 Ton Puller

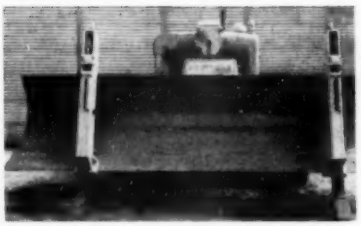
Jaws permit a 34-1/2 in. reach for a maximum diameter of 48 in., a 36-1/2 in. reach for a mixmum diameter of 36 in. and a 38 in. reach for a maximum diameter of 24 in. A 36 in. adjusting screw provides quick adjustment to the work and permits utilization of the full 5 in. ram piston travel.

A new patented jaw adjustment in the puller permits greater ease of handling. Similar to other OTC hydraulic rams the 100 ton Power-Twin unit which operates this puller is easily removed and quickly adapted to many other maintenance jobs in the shop or field.

For more information circle 106 on Service Coupon Page 16 and mail now.

Two New Rippers

Two new rippers; one a Ransome R-78 ripper and the other a Ransome R-46 ripper, introduced by The Ransome Corporation, 2729 Hunting Park Ave., Philadelphia 29, Pa. are designed to fit tractor-bulldozer blades of any make. The Model R-46 ripper was specifically designed for Caterpillar 4A, 4S, 6A and 6S blades and can be adjusted to any blade from 27 in. to 38 in. in height. The Model R-78 ripper was specifically designed for Caterpillar 6S, 7A, 7S, 8A and 8S blades and can be adjusted for any blade from 35 in. to 48 in. in height. The Model R-46 ripper can be adjusted for ripping depth of 6 in., 10 in., 14 in. and 18 in.; and the Model R-78 ripper can be adjusted for ripping depth of 6 in., 12 in., 15 in. and 18 in. In addition to the adjustable ripping depths and being adaptable to various size blades, the Ransome ripper features a removable ripping tooth and one-man rack and pinion depth adjustment. Multiple units can be mounted in any position on the blade. The ripper has a welded box construction of heavy duty steel.



Ransome Ripper

For more information circle 107 on Service Coupon Page 16 and mail now.

Dual-Compression Trench Roller

A dual-compression trench roller for road widening jobs has been announced by the Construction Equipment Division, Blaw-Knox Co., Farmers Bank Building, Pittsburgh, Pa. Built as a companion piece to the two models of Blaw-Knox road wideners, the new Model DTR-552 Blaw-Knox dual compression trench roller is intended to speed and improve compaction of widened road strips.

The new roller is equipped with two heavy compression rolls of 60-in. diameter and 20-in. width which will exert a compression per lineal inch of roll face ranging from 250 lb., without water ballast to 345 lb. with water ballast for each roll. By changing the position of the rolls the compaction width of the roller can be set at any width between 20 and 39 in. per pass where the strip is widened for curves.

Two speeds forward and reverse are provided — a low at 1.62 mph and a high at 5.55 mph. The engine is a Continental F-226 with 50 brake HP at 1,800 rpm and a piston displacement of 226 cu. in. Overall dimensions of the trench roller are 14 ft. long, 8 ft. wide and 6 ft. high. The shipping weight is about 15,000 lb.

For more information circle 108 on Service Coupon Page 16 and mail now.

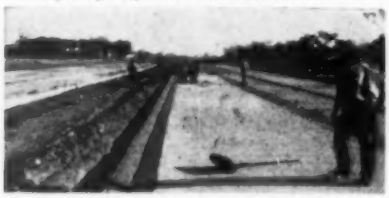
Motor Grader Weighs 40,125 lb.

A new motor grader, The Model T-700, is in production by The Galion Iron Works & Mfg. Co., Galion, O. The grader is equipped with Galion Grad-O-Matic drive which utilizes a GM-Allison torque converter and power-shift transmission to achieve ease of operation and performance on the job. Galion emphasizes that engineered balance is a most important feature of this new grader — with power, weight, and blade pressure scientifically matched. The total weight of the T-700, with scraper is listed at 40,125 lb. It is powered by a 190 hp. Cummins diesel engine.

YOU CAN BID LOWER AND MAKE MORE PROFIT with a DOTMAR Curb, Gutter, Sidewalk Paver!

Dotmar Paver with extensions paves integral gutter, curb and sidewalk.

Dotmar with extensions paves state highway median strip.



Dotmar paves gutter on expressway. A truly versatile machine.

Dotmar paves curb and gutter; over 8' per minute. Total job 14 miles long.

Hundreds of contractors are cutting costs and increasing profits with a Dotmar Paver. Pays for itself in first mile of paving. Greater concrete yield. Easy to operate. Trowels for any shape of curb, gutter, sidewalk or highway strip. Send for Catalog 56.

MAKERS OF AIR ACE HAMMER AND TOOLS
"The size of a pistol—Power Like A Cannon".

Dotmar INDUSTRIES Inc.

501 HANSELMAN BUILDING KALAMAZOO, MICHIGAN

. . . for more details circle 195, page 16

Galion New T-700 Motor Grader Weighs 40,125 lb. Has 190 hp Engine

The torque converter transmits power automatically in an infinite number of ratios. It multiplies the engine torque up to 340% automatically as needed. It also absorbs the load shocks and prevents engine lugging or stalling. A tailshaft governor on the torque converter adjusts the engine speed automatically to meet all loads or conditions — at any predetermined working or travel speed. The power-shift transmission does the shifting for the operator. All he does is move the fingertip control levers — one for forward-reverse, the other for low-intermediate-high speed. Either shift can be made while moving in either direction. There are 3 speeds forward, 3 reverse, with speeds ranging from creeper to high travel speeds in either direction.

Other features listed as standard equipment on the Galion T-700 grader include a hydraulic shiftable moldboard 14 ft. long, 30 in. high, and 1 in. thick; overlay end bits; all tires are twelve-ply 16.00x24 low pressure; four-wheel hydraulic service brakes, plus a transmission brake for parking; foot decelerator for quickly reducing engine speed and for increased ease of operation — permits immediate return to travel speed without changing the hand throttle.

For more information circle 109 on Service Coupon Page 16 and mail now.

Prepared Reflective Street Name Signs

Prepared reflective street-name sign faces — made to order for cities and counties are being marketed by Minnesota Mining and Manufacturing Co., St. Paul, Minn. Made by "Scotchlite" brand reflective sheeting with the street name silk-screened in contrasting reflective colors, the ready-to-use faces are designed for shop refurbishment of existing non-reflective street-name signs, or making new signs.

The reflective faces are prepared on 24-by-24 in. pieces of reflective sheeting, with four street-name sign faces on each sheet. The city or county sign shop personnel cut the faces apart, then adhere them to the sign backing. A weatherproof adhesive on the back of the sheeting bonds the face to the metal backing.

Though the manufacturer's standard is green letters on a silver background, the faces can be prepared in any color combination desired. For orders of 25 sign faces or more, there is no charge for the special set-up for screening the various street-names.

The reflective street-name signs are visible at night under auto headlights from as far as one block away. The 3M company says cities with trial programs under way report enthusiastic public response to the reflective street-name signs.

Further information can be obtained from Dept. 5-357G, Minnesota Mining and Manufacturing Co., 900 Fauquier St., St. Paul 6, Minn.

For more information circle 110 on Service Coupon Page 16 and mail now.

Ever read a guarantee to beat this?

The Gorman-Rupp Guarantee

Our distributors are authorized to put a Gorman-Rupp Contractors' Pump on any pumping job, any time, anywhere, alongside any other make pump, size for size. The Gorman-Rupp Pump is guaranteed to pump more dirty water more hours, using less gasoline and to prime quicker than any other self-priming pump. If it isn't the best all-around pump, our distributor will accept the return of the Gorman-Rupp Pump and pay the user any installation expense incurred.

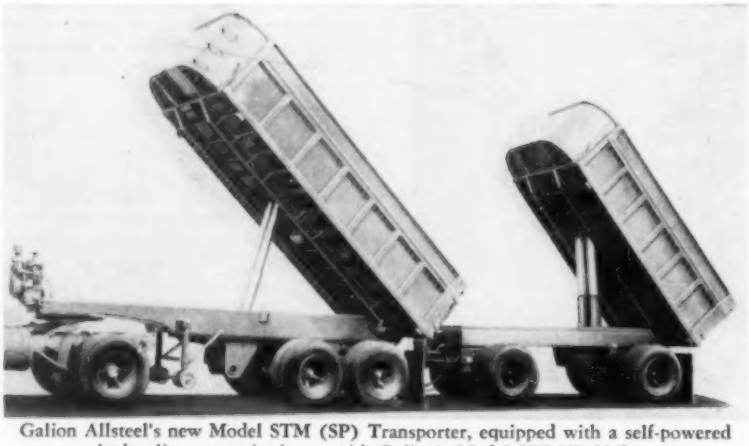
The Gorman-Rupp Company
Mansfield, Ohio

Sizes: 1½", 2", 3", 4", 6", 8", 10". Every pump covered by this plain-language guarantee!

Gorman-Rupp PUMPS

THE GORMAN-RUPP COMPANY
305 Bowman St., Mansfield, Ohio

. . . for more details circle 253, page 16



Galion Allsteel's new Model STM (SP) Transporter, equipped with a self-powered hydraulic system, is shown with Galion's Model HH Hitchhiker.

Tandem Axle Trailer Dump

Designated Model SYM (SP), a new tandem axle trailer dump for use with single axle tractors and equipped with a self-powered hydraulic hoist, has been announced by Galion Allsteel Body Company, Galion, Ohio. Designed for materials hauling use in mixed fleets, the new trailer dump is fitted with a complete hydraulic system including an auxiliary engine, hydraulic pump, spool type control valve and hydraulic oil reservoir, as well as Duo-scopic hoist cylinders.

The self contained hydraulic system of Model STM (SP) is powered by a 15 h.p., 2-cylinder, air cooled gasoline engine. A 2-stage oil bath air cleaner with pre-cleaner and stellite-faced valves afford long engine life under severest operating conditions, the manufacturer claims. A clutch-equipped gear reduction unit, mounted as a part of the engine assembly, drives a Galion hi-volume hydraulic pump through a short drive shaft. Electric starting is offered as optional equipment. The engine is said to provide fast operation of Model STM (SP) Transporter's Duoscopic hoists and the system has adequate reserve capacity for powering Model HH Hitchhiker's hoists in "train" operation.

For more information circle 111 on Service Coupon Page 16 and mail now.

Portable Concrete Plant Does Many Paving Operations

A new portable concrete plant, designed and built by L. Burmeister Co., 4535 W. Mitchell St., Milwaukee, Wis. and owned by George M. Brewster & Son, Inc., Contractors, Bogota, N.J. turns out a variety of batching and paving jobs. These jobs include central mix paving, central mixing for structures, dry batch paving, transit mix operations, mass pours and project pours. The plant has been set up with all necessary controls, scaling and components to provide quality-controlled batching automatically.

The Brewster plant is 42 ft. high. It is equipped with two 4-cu. yd. Burmeister "Tilt-Up" mixers. Minimum plant

Portable Concrete Plant of George M. Brewster & Son, Inc.

height is possible because of the mixer's low headroom requirement, cutting plant height by 8 ft. Mixers for this type of plant are available in sizes of 1, 2, 3, 4, 5 and 6 cu. yd. or larger.

Brewster specifications called for equipping the plant with a 300-ton, 3-aggregate compartment bin. The bin is constructed with a minimum of pins, used in place of bolts for accelerated portability. Bins for plants of this kind are available from Burmeister in any size.

The entire Brewster installation was furnished by L. Burmeister Company as a complete package. It included all starters mounted in cabinet, with all plug-in connections on air cylinders. Gates are solenoid-operated for batching. Other Burmeister plant components are slump meters, moisture compensator, over-and-under interlocks, presets, counters, timers and recorders.

For more information circle 112 on Service Coupon Page 16 and mail now.

Chain Saw Has New Operating Principle

A new chain saw, the V3 (Variable speed transmission) has been added to the line of Hoffco, Inc., Richmond, Ind. According to the manufacturer, the dual-gear design of the V-3 delivers the speed of a direct drive cut with a 1½-to-1 reduction drive which operates the chain at a speed of 1833 ft. per minute. The 3-to-1 geared reduction drive with its

Save gas, gears, tires.....

GET MAXIMUM USE FROM YOUR 4-WHEEL DRIVE!

APPROVED Jeep EQUIPMENT

WARN *Automatic* HUBS MAKE 2 TRUCKS OUT OF 1

Road or no road, Warn *Automatics* give your 4-wheel drive sensational new economy, driving ease and mobility. Your 4 W. D. is automatically a "free-wheeling" 2-wheel drive, or 4-wheel drive AS YOU SHIFT! Use it as a town car, "pick-up" or work horse in and out of mud, sand; on and off the highway. It "free-wheels" or "4-wheels" to suit conditions AS YOU SHIFT! What's more, you can drive at *high speed* in 4-wheel drive on any terrain! Automatic (and Locking) models for *all* makes of 4 W. Ds. from ½ to 1½ tons. Ask your *authorized* factory truck dealer for a FREE DEMONSTRATION of amazing Warn Hubs, or write:

WARN MANUFACTURING CO., Riverton Box 6064-R52, Seattle 88, Wash.
. . . for more details circle 269, page 16

WARN *Automatic* HUBS

Hoffco V3 Chain Saw

chain speed of 913 ft. per minute offers the "lugging power needed for heavy-duty cutting." Gear change can be handled in less than three minutes, with no special tools required.

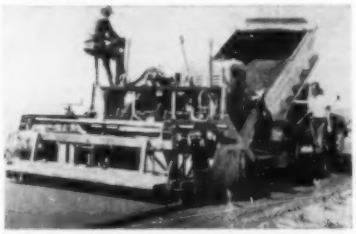
Other V-3 chain saw features include center-line design that will cut within 3½ in. of the ground, shatterproof magnesium and aluminum casting construction, diaphragm pump carburetion, concealed oil reservoir, convenient positioning of throttle and manually operated oiler.

For more information circle 113 on Service Coupon Page 16 and mail now.

Bituminous Paver Gives Controlled Compaction

A new bituminous paver, announced by Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn., subsidiary of Poor & Company, Chicago, is specifically designed to give controlled compaction and uniform density of mat from any reasonable mix, and at a laydown rate exceeding all previous standards.

Key units of the new paver are its radically different Vibromatic screed and compactor. The oscillating screed, consisting of a toothed strike-off bar and a precompactor, meters out the material as required for whatever thickness of mat is needed, and by means of oscillation and vibration, fills in the voids across the entire width of the mat being laid. Following the screed is a high-speed vibrating compactor, heated across its full width, which irons out the surface of the mat to a uniform density. Tests made on mat samples across the full width of lay are stated to have, in all cases, shown an absence of segregation and no significant variation in density or specific gravity.



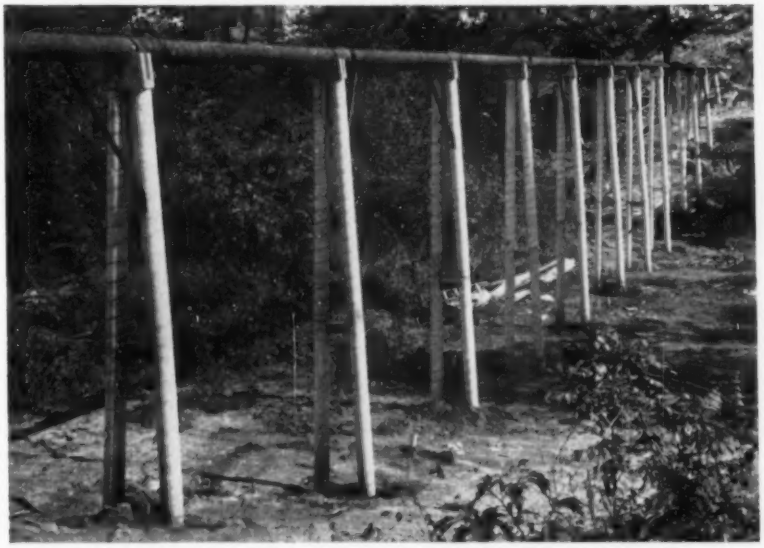
Pioneer Vibromatic Bituminous Paver

Thickness of mat is controlled by a simple adjustment of independently operated screws, one located on each side of the screed assembly, depth of mat being adjustable up to 10 in. Pre-compaction by the beveled oscillating screed is stated to assure uniform density and thickness of the mat. Crawler tracks are long enough (84 in. on ground) to bridge ordinary irregularities in the base

SONOTUBE®

FIBRE FORMS

for round columns of concrete



Sewer Line, Springfield, Ill. William Newlin, design engineer; Allied Contracting Co., contractors. Photo by John C. Newlin

Money-saving "trestle" for pipe line!

. . . low cost SONOTUBES® make it possible

Low cost SONOTUBES were the forms for these round columns of concrete which carry an 8" cast iron sewer pipe over a 306-foot wide ravine!

In the center of the span the columns rise 26 feet above the ground. SONOTUBE Fibre Forms of 8" I. D. were quickly erected with minimum bracing atop square concrete footings.

For all types of piers, underpinning and columns. SONOTUBES provide a method of forming round columns of concrete which saves time, labor and money. Available in 26 sizes, from 2" to 36" I. D. up to 50' long. Can be sawed on the job to your requirements or ordered in specified lengths.

Use Sonoco's patented "A-Coated" Sonotubes for finished columns; wax coated also available.

For complete technical information and prices . . . write

SONOCO PRODUCTS COMPANY

CONSTRUCTION PRODUCTS DIVISION

HARTSVILLE, S. C. — MAIN PLANT

LOS ANGELES, CAL.
5955 SOUTH WESTERN AVE

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14 SOUTH PARK STREET

AKRON, IND. • LONGVIEW, TEXAS • BRANTFORD, ONT. • MEXICO, D. F.

sonoco — PAPER CARRIERS — REG. U.S. PAT. OFF.

. . . for more details circle 259, page 16

course. A simple screw, located at the rear of the paving section, controls crown setting of both oscillating screed and vibrating compactor through a mechanically interlocked device.

The Vibromatic machine is stated to have laid a smooth, even, uniform mat 1½ in. thick, 12 ft. wide, traveling at a rate of 66 ft. per minute, without tearing or pulling the mat. Laying a mat up to 2 in. thick at the same speed and width of lay with no loss in paver performance or mat quality has been demonstrated to be possible. In continuous operation, the paver has been reported to have laid betwen 250 and 300 tons per hour, moving at top paving speed.

Paving width of the standard machine is 10 ft., and extensions in 6 in. and 12 in. increments are available to provide laying of a mat to 14 ft. wide. Mouldboard attachments for laying a beveled shoulder and special attachments for beveling the edge at a predetermined angle can also be supplied. Over-all dimensions of the Vibromatic are 18 ft. long, 10 ft. wide (without attachments), and 6 ft 10 in. to the top of the engine and 7 ft. 2 in. to the top of the seat. Weight without extension sections for full 14 ft. paving width (750 lbs.) is 20,500 lbs. Power is furnished by a 43 hp, 1700 rpm, 6 cylinder F244 Continental Red Seal gasoline engine power unit with 11 in. Borg & Beck clutch.

For more information circle 114 on Service Coupon Page 16 and mail now.

Wooldridge Scraper With Goodyear Wide Base Earth Mover Tubeless Tires

Tubeless Wide Base Earth Mover Tires

The first and largest tubeless earth mover tires, built by The Goodyear Tire & Rubber Co., Akron, Ohio, have been installed on the job, and the company is now in production with a line of these tires. Known as wide base earth movers, size 37.5-33, these tubeless tires have been installed on two 41 cu. yd. self-loading scrapers, currently moving dirt on a highway construction project in Ohio.

Wide base tubeless earthmover tires and their extra wide rims were designed by Goodyear for use with new low air pressures, thus giving tires greater flotation. Although Goodyear has been manufacturing wide base earth movers for some time, this application marks the first tubeless, as well as the largest, earth mover tires.

For more information circle 115 on Service Coupon Page 16 and mail now.

Tractor Features "Power Turn" Steering

An improved Model OC-18 crawler tractor, announced by Industrial Sales Division, The Oliver Corporation, 400 West Madison St., Chicago 6, Ill., has many new design features. Powered by an Oliver full diesel engine delivering 161 h.p. and weighing 32,500 lb., the new OC-18 mounts a full line of matched allied equipment.

A feature of this new OC-18 is Oliver's power-turn steering. This new steering principle for crawlers combines all of the advantages of Oliver's differential steering with the advantages of clutch steering. The new power-turn innovation permits operators to make spot turns or gradual turns of any angle. An equally important feature of power-turn is that without shifting the operator can decrease speed by 38% with an increase

Model OC-18 Crawler Tractor

in drawbar pull or push of up to 60% depending on weight and traction. The machine instantly responds by changing from direct drive to planetary reduction drive with a reduction in speed and a corresponding increase in drawbar pull. Releasing the levers returns the tractor automatically to its original transmission setting. For this new steering method the controls have been regrouped for easy, simultaneous handling of more than one lever by the operator. Four levers provide full maneuverability of the new OC-18. These levers require only fingertip pressure. The two inside levers are

WHY LUFKIN CHROME CLAD TAPES last longer
Tempered steel tape.
Markings bonded direct to steel protected by higher surface of multiple electroplatings.
Multiple coats of electroplating.
Rust resistant coating.
Hard, smooth, non-glare chrome finish further protected by plastic coating.
EASY TO READ MARKINGS THAT ARE DURABLE
LEADER
CHROME CLAD
BETTER MEASURE WITH LUFKIN
397

Chrome Clad tape lines, a Lufkin exclusive, won't crack, chip or peel and are rust and corrosion resistant. Their jet black markings are easy to read and won't wear off. For longer wear try the Chrome Clad Leader — an example of a superior Lufkin tape with an "All-Metal" line. Has rust-resistant steel case covered with handsome vinyl. Replaceable lines. 25, 50, 75 and 100 ft. lengths.

BUY LUFKIN TAPES · RULES
PRECISION TOOLS
FROM YOUR SUPPLY STORE

THE LUFKIN RULE CO., Saginaw, Michigan

. . . for more details circle 255, page 16

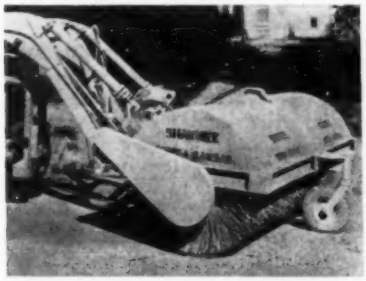
for power-turn's planetary reduction drive. Individually they provide gradual turns. The outside levers are for spot turns. There is both hand and foot positive braking.

Improvements have been made to the heavy-duty track frame and tracks as well as the use of a more rugged and efficient transmission. A Hi-Life wheel system featuring anti-friction bearing is also available.

For more information circle 116 on Service Coupon Page 16 and mail now.

Street Broom for Tractors

A recent addition to the line of hydraulically controlled tools of Shawnee Manufacturing Co., Inc., 1947 G N. Topeka Ave., Topeka, Kan. for light industrial tractors is the Shawnee street broom attachment. It is designed to adapt to almost any make front end loader. The broom is operated by a hydraulic motor with controlled revolutions of from 150 to 350 per minute. It can be angled left or right as much as 30 degrees. The India palm broom core measures 7 ft. wide and is 24 in. in diameter.



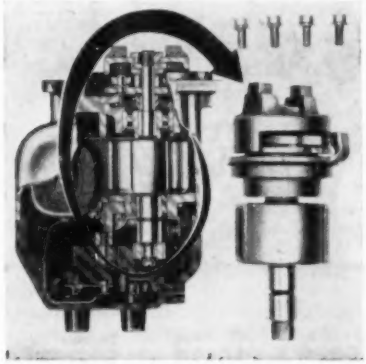
Shawnee Street Broom Attachment

The Shawnee street broom is equipped with a "Stabilizer Wheel" to eliminate bouncing on rough streets, and the attachment can be installed or removed from the tractor in approximately 10 minutes.

For more information circle 117 on Service Coupon Page 16 and mail now.

Magneto Design Features Easy Servicing

One of the outstanding features of its improved XH and XHD magneto line, according to Wico Electric Co. is its simplified construction, permitting re-



Improved Wico Magneto

WHAT KIND OF CONCRETE JOB HAVE YOU GOT FOR DUMPCRETE?®

Highway Paving?

Low-cost Dumpcretes helped set new records on Garden State Parkway, Ohio Turnpike, New Jersey Turnpike, and other big paving projects. Central mixing eliminated confusion of equipment at site—improved quality—boosted production.

Heavy Construction?

Morrison-Knudsen and Peter Kiewit Sons Co. saved time and money using Dumpcretes to place concrete for world's largest pumping plant and East Powerhouse at Grand Coulee Dam. Dumpcretes have been project-proved by scores of top national contractors.

Light Construction?

Light-weight Dumpcretes pay their own way hauling *and* placing concrete right into forms for foundations, curbs, gutters... speeding up scattered pours... hauling or stockpiling *any* material that flows. No downtime with Dumpcrete.

SEND TODAY FOR PROJECT PERFORMANCE RECORDS, FEATURES, AND FULL FACTS ABOUT THIS FASTER, EASIER, LOWER-COST WAY TO HAUL AND PLACE BETTER CONCRETE.

MAXON CONSTRUCTION COMPANY, INC
Manufacturing Division 3
2600 Far Hills Building, Dayton 9, Ohio

Send me project reports and literature showing what Dumpcrete has done — what it can do for me.

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NAME_____

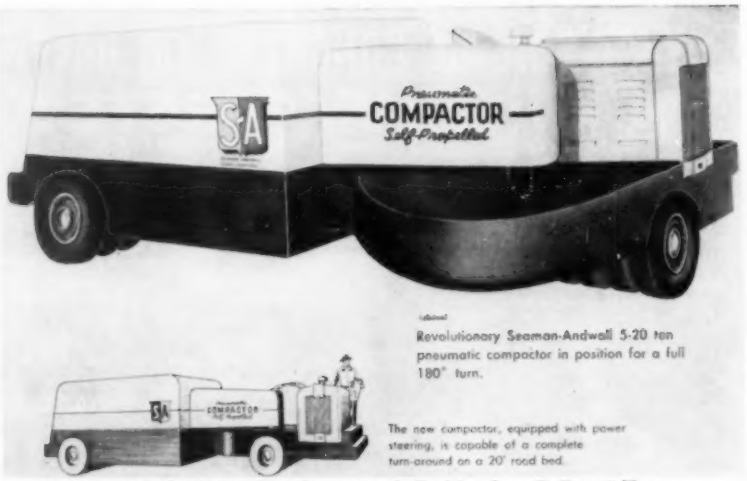
TITLE_____

FIRM_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

. . . for more details circle 251, page 16



Revolutionary Seaman-Andwall 5-20 ton pneumatic compactor in position for a full 180° turn.

The new compactor, equipped with power steering, is capable of a complete turn-around on a 20' road bed.

Seaman-Andwall 5-20 Ton Compactor in Position for a Full 180° Turn

moval of the magnetic rotor, cam, ball bearing, oil seal and impulse coupling as a unit, by taking out only four screws. (See illustration.) No special tools required.

Another easy-service feature is the exclusive design of the distributor cap which makes it unnecessary to completely remove the screws to take it off. This method eliminates the common annoyance of dropping and the loss of the screws during servicing.

The Wico XH and XHD model magnetos are popular as original equipment on gasoline engines and are widely used in the oil fields, on heavy construction and farm equipment and on road building machinery — where power interruptions must be prevented. Other models of Wico magnetos are used on small and medium sized engines that furnish power for lawn mowers, cultivators, crop sprayers and similar light equipment. Write for complete information to Dept. PR-1, Wico Electric Co., West Springfield, Mass.

For more information circle 118 on Service Coupon Page 16 and mail now.

Pneumatic Tired Road Compactors

A new design in heavy duty pneumatic tired road compactors has been announced by Seaman-Andwall Corporation, 291 North 25th St., Milwaukee, Wis. The new S-A compactor, self-propelled, is capable of road speeds up to 20 miles per hour for easy transport to the job. Equipped with power steering for effortless maneuverability, company officials say it easily makes a 180° turn on a 20 ft. roadway. Equipped with 9 pneumatic tired wheels on the rear, 8 on the front, the new S-A compactor — with front-end-drive — provides a "straight down" pressure, even in turning, that is claimed to eliminate the pushing action, surface shear, scuffing, and material displacement. Four 500 gal. compartments provide for liquid or sand ballast for wide variation in road weight from 5-ton empty weight to 15 tons with water or 20 tons with sand ballast.

For more information circle 119 on Service Coupon Page 16 and mail now.

2000-3000 lb. Power-Lift Tail Gate

The new Load-N-Gate power-lift tailgates of 2000 and 3000 lb. capacity respectively, designed for mounting on 1½ ton and larger trucks and trailers with stake, platform and van bodies, have been announced by Hercules Steel Products Co., Galion, O.

Job Site Pickup . . .
Job Right Delivery

Southern Tire representatives pick up your worn tires at your job site after work hours, and return them guaranteed to equal new tire mileage . . . job right for long service!

You save the expense of equipment downtime, plus savings of 40% or more compared to the cost of new tires, when you specify Southern Tire's Retreading Service.

Let Southern Tire's retread specialists and superior facilities help you save time and money. Call your favorite dealer and specify Southern Tire Retreads.

Southern Tire's GIANT TIRE RETREADING

- **ROCK SERVICE, TRACTOR TYPES OR RIB TREADS**
  All sizes from 1100x24 to 2700x33, and new sizes 29.5x25 and 29.5x29.
- **SUPERIOR 3-SECTIONAL MOLDS**
  Three-Sectional molds assure no buffing to breaker strips, regardless of growth.

SOUTHERN TIRE COMPANY

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FLORENCE, ALA.

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Florence 85 or 86

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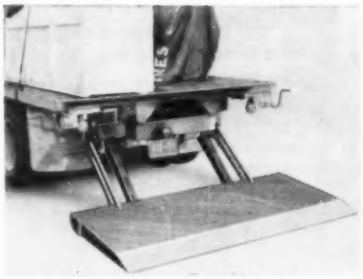


Model H-30 Load-N-Gate Power-Lift Tail-Gate

Designated Models H-20 and H-30, the new Load-N-Gates offer single lever control of raising and lowering, hydraulic closing and opening plus compact construction engineered to permit installation on any truck or trailer frame alterations.

The Load-N-Gate lowers by gravity, stopping when the ground, loading dock or an obstruction is met. A single lever located at each end of the tail-gate controls loading operation. Full power opening and closing of the Load-N-Gate is controlled by a second lever located adjacent to each operating lever. Full-automatic or manual control of the Load-N-Gate can be selected by making one simple adjustment.

For more information circle 120 on Service Coupon Page 16 and mail now.

Improved Adams TraveLoader

An improved Adams TraveLoader has been announced by Le Tourneau-Westinghouse, Peoria, Ill. The TraveLoader, a product of Adams Division, Indianapolis, Ind., is a self-propelled, belt-type loader for loading all types of loose material into trucks from either windrows or stockpiles.

A rocker-type foot pedal operating an over-center clutch now controls the starting and stopping of the TraveLoader — rock the pedal forward to put the machine into motion; press it backward to stop. No gears to shift when stopping, no spring clutch to ride. Tire sizes have been increased to 13.00-24 lug type, both front and rear, providing more flotation and better ground grip in soft going.

Adams TraveLoader

By hydraulic control from the cab the pickup moldboard can now be tilted at either side to better conform the machine to the surface being worked such as on sloping highway shoulders.

Other improvements include a shorter paddle-type feeder for snappier performance in placing material on the conveyor belt; feeder cross shafts have been eliminated thus enabling the TraveLoader to load occasional large rocks, slabs

How seismic surveys saved time and money for the Connecticut Expressway

Ammann & Whitney needed to know depth to bedrock along the center of all major cuts of the 129-mile Connecticut Expressway — in a hurry. A Gahagan 4-man Seismic Survey Crew gave the answer in just 30 working days. Gahagan Seismic Crews also worked with Section Engineers Knappen, Tippetts, Abbett, McCarthy, and Loomis & Sullivan. The latter firm, for instance, used a continuous profile of bedrock elevation, right and left of centerline, to draw up definitive cross sections every 50 feet. This expedited planning by two-thirds the usual time and gave a wealth of data that would have cost about four times more if obtained by other means. Write for Bulletin 3 giving facts about seismic survey use with highways, dams, power plants, bridges and other construction projects. Address Geophysical Survey Division, Gahagan Dredging Corporation, 90 Broad St., New York 4, N. Y.

Established in 1898, Gahagan is a leader in hydraulic dredging

ANOTHER
GAHAGAN
CASE HISTORY

. . . for more details circle 201, page 16

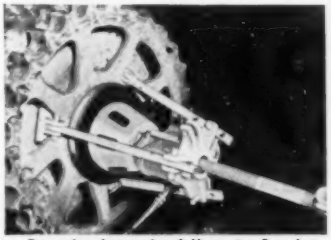
CRAWLER TRACTOR **SPROCKETS - MASTER PINS**
REMOVED in MINUTES in the field

Removing Track Master Pin with OTC Hydraulic Ram and Adaptors.

with **ONE**
OTC HYDRAULIC PULLER

Hydraulic Ram and Puller makes both jobs easier.

One man can remove a Crawler Track Master Pin or a Sprocket or both in mere minutes with the OTC Hydraulic Puller and Attachments. Available in 50 ton or 100 ton capacities these versatile sets are easily and quickly put to work in the shop or field. Hand or electric pumps are available . . .

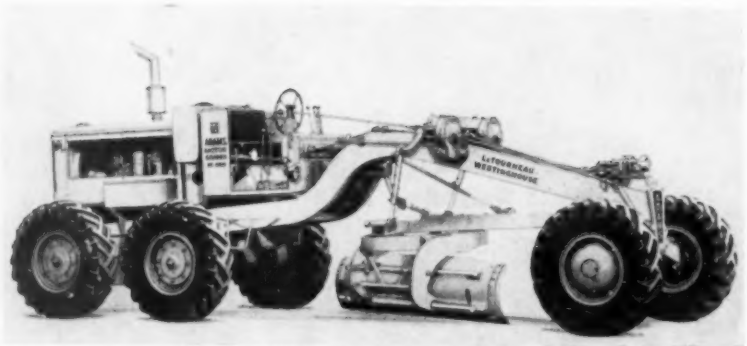


Removing International Harvester Sprocket with OTC Hydraulic Ram and Adaptors.

The OTC POWER-TWIN HYDRAULIC UNITS are also easily adapted to pull, bend, straighten, press or spread—pull or install bearings, sheaves, gears or pulleys on all types of contractor equipment. Quickly pay for themselves in man hours saved. For the complete story on the OTC Hydraulic line write for Bulletin HY-55.

OWATONNA TOOL COMPANY
381 CEDAR STREET • OWATONNA, MINNESOTA

. . . for more details circle 270, page 16



Adams "660" Now Powered by 150 h.p. Engine

of concrete, or asphalt without damage to the feeder; approximately 3 ft. shorter wheelbase has been engineered into the machine for increased maneuverability and an improved gear drive has been added between engine and transmission.

The TraveLoader, with a choice of two conveyor lengths, is powered by an International gasoline engine or G.M. diesel engine which furnishes power for operating the feeder and conveyor as well as propelling the machine. Several working speeds are available as low as .29 mph with a maximum traveling speed of 26.7 mph. It is claimed that the TraveLoader has a loading capacity up to 10 cu. yd. per minute in loose material; up to 20 cu. yd. in snow, depending upon the type.

Important optional equipment includes a cross conveyor which permits loading trucks on either side of TraveLoader with equal speed and ease, eliminating wasted time while trucks get into position when loading from stockpiles. Other optional equipment includes cab top, with or without enclosure; cavein guards for the moldboard for stockpile loading; driving and working lights, windshield wiper, hour meter, and heater.

For more information circle 121 on Service Coupon Page 16 and mail now.

Engines and HP Ratings Changed in Adams Motor Graders

A number of changes in engines and horsepower ratings in their line of Adams Motor Graders has been announced by Le Tourneau — Westinghouse Co., Peoria, Ill.

The No. 660, formerly powered by Cummins 140 h.p. diesel engine, is now powered by Cummins or GM 150 h.p. engine.

The No. 550, formerly powered by 115 h.p. International engine, is now equipped with 123 h.p. GM or Cummins engine.

The No. 400, formerly powered by 100 h.p. International engine, is now offered with 100 h.p. Cummins or 104 h.p. GM engine.

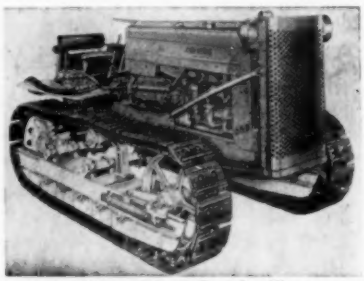
The No. 330, may be had with International 75 h.p. engine or 80 h.p. Cummins or GM engine.

For more information circle 122 on Service Coupon Page 16 and mail now.

New Deere Tractors Have 20% More Power

The new handyman John Deere "420" series tractors — crawler and wheel-type — are now in production at the Dubuque (Iowa) tractor works of Deere Co., Moline, Ill. The new tractors closely resemble the John Deere "40" Tractors, which they replace; but the new 2-cylinder, valve-in-head engine, which is common to both models, delivers approximately 20% more power. No official test has been made, but it is estimated that the increase will bring the tractors close to 30 belt horsepower. Drawbar horsepower is increased from 20 to approximately 25.

The additional power is attained primarily by changes in the bore, the cylinder head, valve mechanism, manifolding, carburetion and the new compression ratio of 7 to 1. A new pressurized



John Deere "420" Crawler Tractor Weighs 4,000 lb. and Delivers 25 h.p. on Drawbar

cooling system with water pump and thermostat replaces the thermo-siphon system formerly used. Pistons are 4-¾-diameter aluminum.

Features of the new "420" Tractors include: low, compact, rugged construction, quick maneuverability, "live" hydraulic system, adaptability to a wide variety of work, low initial and operating costs, and ease of maintenance.

For more information circle 123 on Service Coupon Page 16 and mail now.

McKIERNAN-TERRY
SINGLE-ACTING
PILE HAMMERS

MK333

- The most modern design of single-acting pile hammer on the market, based on more than half a century of specialized experience
- Specially designed for driving into very dense substances such as clay, hard pan, compacted gravel, etc. and for driving heavy mass piles
- Built in a range of 5 sizes.
- All parts completely enclosed for protection against grit, dirt and damage, and for safety
- The only single-acting pile hammers that can perform underwater work
- Many exclusive features for most effective blows, convenient operation and maintenance, and long wear. Write for Catalog

McKIERNAN-TERRY CORPORATION
Manufacturing Engineers
30 MERCER STREET, DOVER, NEW JERSEY
Plants at Dover, N. J. and Harrison, N. J.

• Also builders of coal and ore bridges, bulk material unloaders and specially designed machinery.

McKIERNAN TERRY

. . . for more details circle 275, page 16

ARMCO PIPE
solves many problems as a construction tool

A familiar sight in permanent drainage installations of all kinds, Armco Corrugated Metal Pipe also provides the quick, economical answer to many temporary problems in the field. Drainage under run-around roads, detours and access roads are a few of the jobs you can do with versatile Armco Pipe. It is easy to handle and install and is completely salvable for re-use.

This Armco Pipe provided drainage under a temporary access road on the Ohio Turnpike contract of A. J. Baltes, Inc., Norwalk, Ohio.

A battery of Armco Pipe-Arch structures provides the waterway area for this temporary "bridge" installed to handle heavy equipment moving material from a deep cut section on the West Virginia Turnpike.

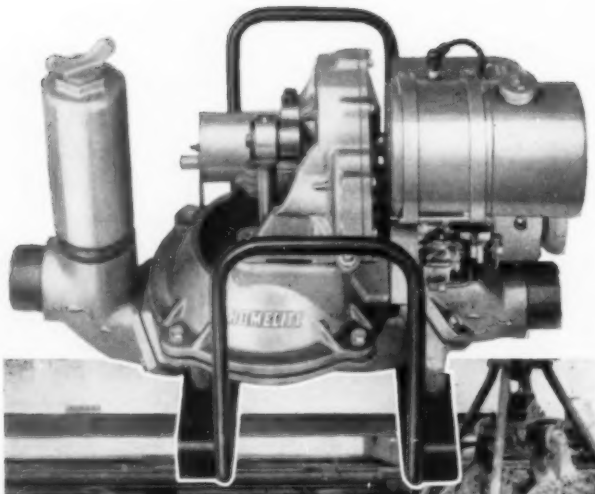
Corrugated Metal Pipe culverts handle the winter flow of the Rio Grande River under temporary access road. Sharp & Fellows Contracting Company, Los Angeles, used the road during construction of new Alameda Bridge near Albuquerque.

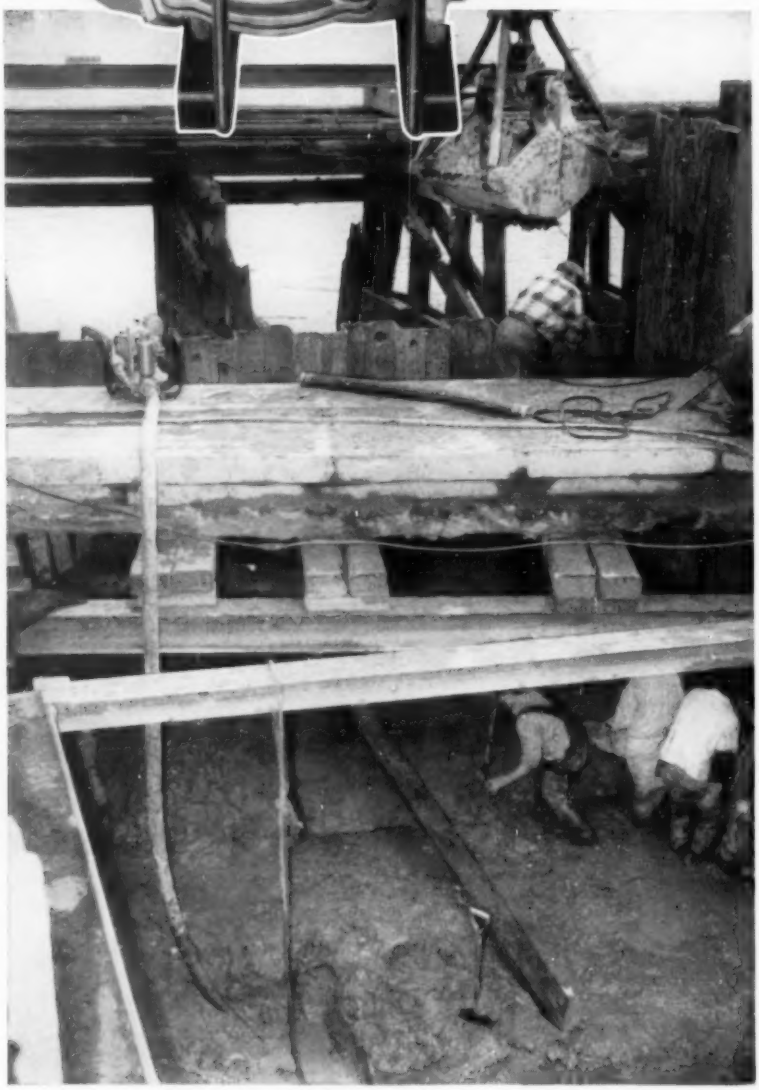
ARMCO®

Armco Drainage Structures

A network of 50 Armco Plants makes it easy to get the Armco Pipe you need when you need it. Write us for details or help with special drainage problems. Armco Drainage & Metal Products, Inc., 3416 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

. . . for more details circle 250, page 16





NEW HOMELITE Diaphragm PUMP

for All Heavy-Duty jobs*

This new, job-tested Homelite diaphragm pump will handle *all* your heavy-duty jobs with greater ease and mobility.

Its new internal design not only pumps up to 5000 gallons per hour but handles sand, mud, solids and muck with equal ease. Because it weighs only 120 pounds, it goes anywhere quickly and easily . . . saves money in labor and haulage costs.

The entire unit construction is keyed to smooth, continuous performance. Flapper valves have special self-cleaning action to prevent clogging. The accumulator holds flow at a steady rate. Gears are totally-enclosed for full protection. Spring skids provide steadier footing, reduce vibration.

Write or call your nearest Homelite representative for complete information or a free demonstration.

**120 pounds for easier carrying*

Model 20DP3 has guaranteed suction lift up to 28 feet and total head up to 50 feet, including friction.

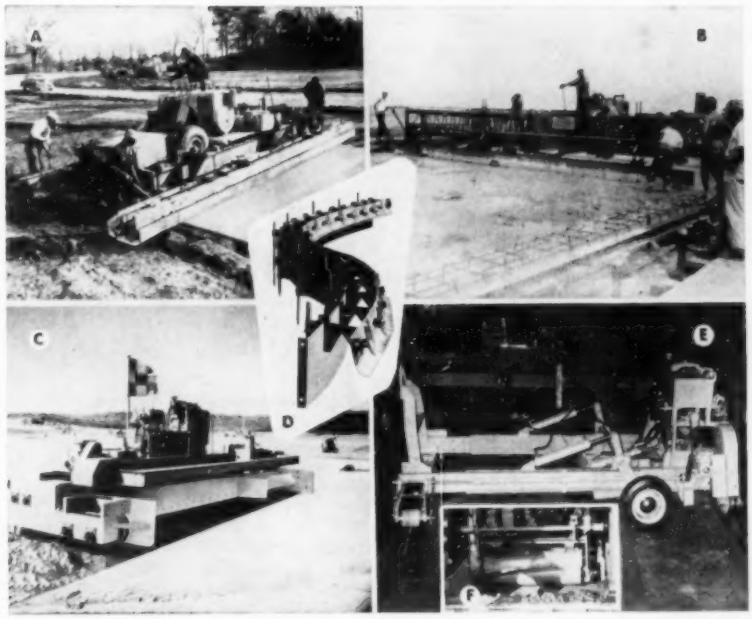
Manufacturers of Carryable
PUMPS
GENERATORS
BLOWERS
CHAIN SAWS

HOMELITE

A DIVISION OF TEXTRON AMERICAN, INC.

7002 RIVERDALE AVE., PORT CHESTER, N. Y.

. . . for more details circle 211, page 16



A — Self-Widening Finishing Machine.
B — Bridge Deck Finishing Machines.
C — Concrete Spreaders.
D — Hinged Flexible Forms.
E — Mechanical Curb Builder.
F — Curb Builder Working on Construction Project.

New Products in Concrete Paving Field

Six new products in its line of concrete paving equipment have been announced by General Road Machines, Inc., North Main St., Niles, Ohio. The new products are: Mechanical curb building machines, self-widening finishing machines, spreaders, bridge deck finishing machines, longitudinal float machines, and a flexible radius form.

Self-widening finishing machines were job-proved on state highway projects in Indiana and Pennsylvania. They are equipped with GRM 16 in. wide screeds and 6 speed transmissions. The machine operator, by simple control, widens and narrows the width of the machine as it works concrete.

The GRM bridge deck finishing machine has obtained enthusiastic contractor acceptance on its first job on the elevated structures of the New Jersey Turnpike Extension. This machine is self-widening from 24 to 36 ft. GRM bridge finishing machines are arranged to ride off special rails while finishing concrete with suspended screeds.

The mechanical curb building machine received its final field trials in the Detroit area. This machine mechanically finishes roll type curbs. It eliminates to a large extent the back-breaking hand labor necessary to hand-form roll type curbs. The machine is designed to work in tandem with the GRM off-set screed finishing machine which eliminates carry back of concrete for integral curb construction.

The new GRM spreader has been completely job tested on projects in Arkansas and Ohio and is scheduled for production in the second quarter of 1956. This machine incorporates three paddles to distribute concrete evenly between the forms. The machine is light and fast with four traction speeds forward and reverse, and completely independent hydraulic paddle control with infinite traversing speed adjustments. One of the novel features of this machine is its ease of width adjustment.

General's proto-type float machine was job tested in Arkansas. Last on the list of GRM developments, this machine will go into production late in the second quarter of 1956.

The new general flexible radius forms incorporate hinged joints on 1 ft. spacing to effect inside and outside radius work and serpentine curb construction.

For more information circle 124 on Service Coupon Page 16 and mail now.

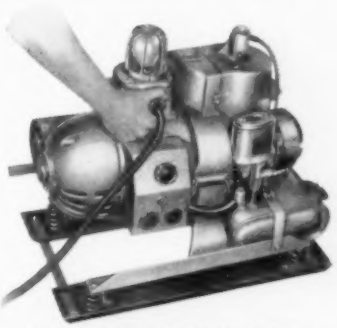
Extra Tough Hose for Air and Water

A new, high visibility hose of braided wire construction for extra safety at pressures to 2000 p.s.i. has been announced by Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N.J. Strong enough for air actuating service on the heaviest machinery and loading equipment, yet it is light and flexible enough for pneumatic tools. It is built with special steel braids that offer maximum resistance to accidental crushing in mine and quarry service. In addition, a neoprene tube that withstands hot oil from compressors, and a bright yellow cut-resistant cover to provide maximum visibility and hose life. Sold under the name Super-Master BW Air and Super-Master BW Water.

For more information circle 125 on Service Coupon Page 16 and mail now.

CHOOSE
from a full line of
HOMELITE
Carryable
Construction
Equipment

SELF-PRIMING CENTRIFUGAL AND DIAPHRAGM PUMPS
Sizes: 1½" to 3" — capacities to 15,000 g.p.h. for dewatering and water supply.



ELECTRIC GENERATOR SETS FOR TOOLS AND LIGHTS
Complete range of sizes and voltages up to 5,000 watts.

LIGHTWEIGHT POWERFUL ONE-MAN CHAIN SAWS
Complete line of saws with clearing and brushcutter attachments for every woodcutting job.

HOMELITE
A DIVISION OF TEXTRON AMERICAN, INC.
PORT CHESTER, N. Y.

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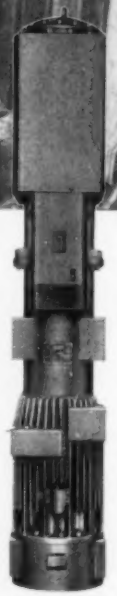
No Auxiliary Power Equipment with

SYNTRON

DIESEL PILE HAMMERS

- Easily attached to swinging leads of diesel cranes.
- Quick conversion of crane to mobile pile driving rig.
- Heavy-Duty, rugged construction for driving concrete, steel or wood piling.
- In capacities from 5,000 to 20,000 ft. lbs. per blow.



ROCK DRILL

2000 powerful blows per minute with automatic rotation of drill steels. Drills 2 feet per minute.

PAVING BREAKER

100% self-contained, the Paving Breaker is good for busting, cutting, digging and tamping.

Write for Free Catalogue Data

SYNTRON COMPANY

384 Lexington Ave. Homer City, Penna.

. . . for more details circle 241, page 16

Improvements in Cleveland Backfillers

A new and wider version of Cleveland's versatile back-filler, known as the Model 80W, has replaced the original Model 80. Although the Model 80W weighs 11,500 lb. — approximately 1,500 lb. more than the original machine — its ground bearing pressure has been reduced from 7.2 to 4.5 lb. per sq. in. This bearing pressure was achieved by increasing the machine's over-all width to 6 ft., 3 in. and equipping it with 16 in. wide crawler pads instead of the 10-in. wide pads formerly used. The Model 80W's side crane capacity has been increased to 25,000 foot-pounds.

The tamper unit, always available for installation on the Model 80, is also available for the Model 80W and now is provided with an additional 2-ft. tamper boom extension, adding to its side-reach for tamping wide trenches. Electric starting of the tamper unit from the operator's seat is another new feature.

Power has been substantially increased in Model 190 Cleveland backfiller. This machine is now driven by a 525 cu. in. diesel engine (93.5 hp @ 1,500 rpm governed speed) instead of the 460 cu. in. diesel engine (71 hp @ 1,200 rpm) used formerly. Backfill clutch lever linkages have been improved, permitting easier, more accurate control of the backfill board, resulting in smoother clutch action and an increase in the wear life of the clutch linings. Special spacer washers have been added to the track adjusting bolts, greatly increasing maintenance-free track life. The over-all roading height of the "190" has been reduced from 9¾ ft. to 8 ft., simplifying transport on low-bed trailers.

For more information circle 126 on Service Coupon Page 16 and mail now.

Two-Way Radio for Maintenance Departments

A new two-way radio expected to be a boon to highway maintenance departments has been announced by the General Electric Co., Electronics Park, Syracuse, N.Y. The new radio unit is intended for use in a car, truck or other mobile vehicle. It will allow the driver to monitor two different radio frequencies at the same time, and is stated to cost 35% less than previous equipment.

The new simultaneous monitoring mobile two-way radio unit may be obtained in either the 25-50 megacycle band or 152-174 megacycle band or any combination of both regardless of the separation between the two frequencies. The new mobile unit is housed in a standard 17 in. (wide) Progress Line cabinet which features relay rack construction for greater protection against stress, strain and torsion. With the appropriate accessories, it may be mounted either on the dashboard or in the trunk.

For more information circle 127 on Service Coupon Page 16 and mail now.

Improved Model 320 Cleveland Trencher

The Caterpillar D339 engine has replaced the D-8800 engine in Model 320 Clevelands. Standard trench width capacity of the machine has been increased from 48 in. to maximum of 52 in. Rims and buckets are made of heavier, ¾ in. hi-tensile steel instead of ⅝-in. Conveyor now may be installed for right side or standard left side discharge. A crawler kick-out clutch has been added, permitting stopping and starting of the crawlers without interruption of any of the other operations such as digging, conveying and hoisting. An additional intermediate conveyor extension kit is now available, adding 2 ft. to spoil discharge point. In addition to conventional slopers for regular pipeline trenching, special heavy slopers as well as dual discharge conveyors for spoil discharge to both sides of trench simultaneously are now available for trenching drainage canals.

For more information circle 128 on Service Coupon Page 16 and mail now.

Trailers for Construction Industry

The Fruehauf Trailer Co. has issued a folder showing various types of trailers suitable for the construction industry. The types covered in the folder are carryalls; dump trailers of various types; as well as tanks for bulk cement, asphalt and steel platforms. Copies are available from the Advertising Department, Fruehauf Trailer Co., 10940 Harper Ave., Detroit 32, Michigan.

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Bituminous ROADS AND STREETS

Published by Gillette Publishing Company,
22 West Maple Street, Chicago 10, Illinois

How drainage ditches through stony materials were protected on a steep mountain grade in Topanga Canyon, Los Angeles County, California. Hand spray bituminous application part of recent rehabilitation.

Use and Testing of Asphalt Coating Additives
— By L. T. Crews and M. L. Kalinowski

Look at the uniform triple-lap coverage and straight edges you get with a "Black-Topper"

You can see the results of Etnyre's exclusive triple-lap coverage (spray from each nozzle overlapping *two* other sprays) in the unretouched photograph above. Road builders have learned that single lap coverage is utterly unsatisfactory . . . double lap coverage somewhat better . . . but triple lap coverage is the complete answer to hitting rough aggregate from all possible angles for complete coverage.

Moreover, by turning the end nozzle as indicated, you get a sharp line edge which adds the finishing touch to the job. With this accurate alignment, you can spray right up to the edge of curbs. Such dependable operation and uniform, accurate distribution are typical results you can expect from an Etnyre. Investigate today —find out how soon a "Black Topper" can be delivered to you to handle your work faster, better, more economically!

E. D. Etnyre & Co., Oregon, Illinois

SEE YOUR ETNYRE DEALER

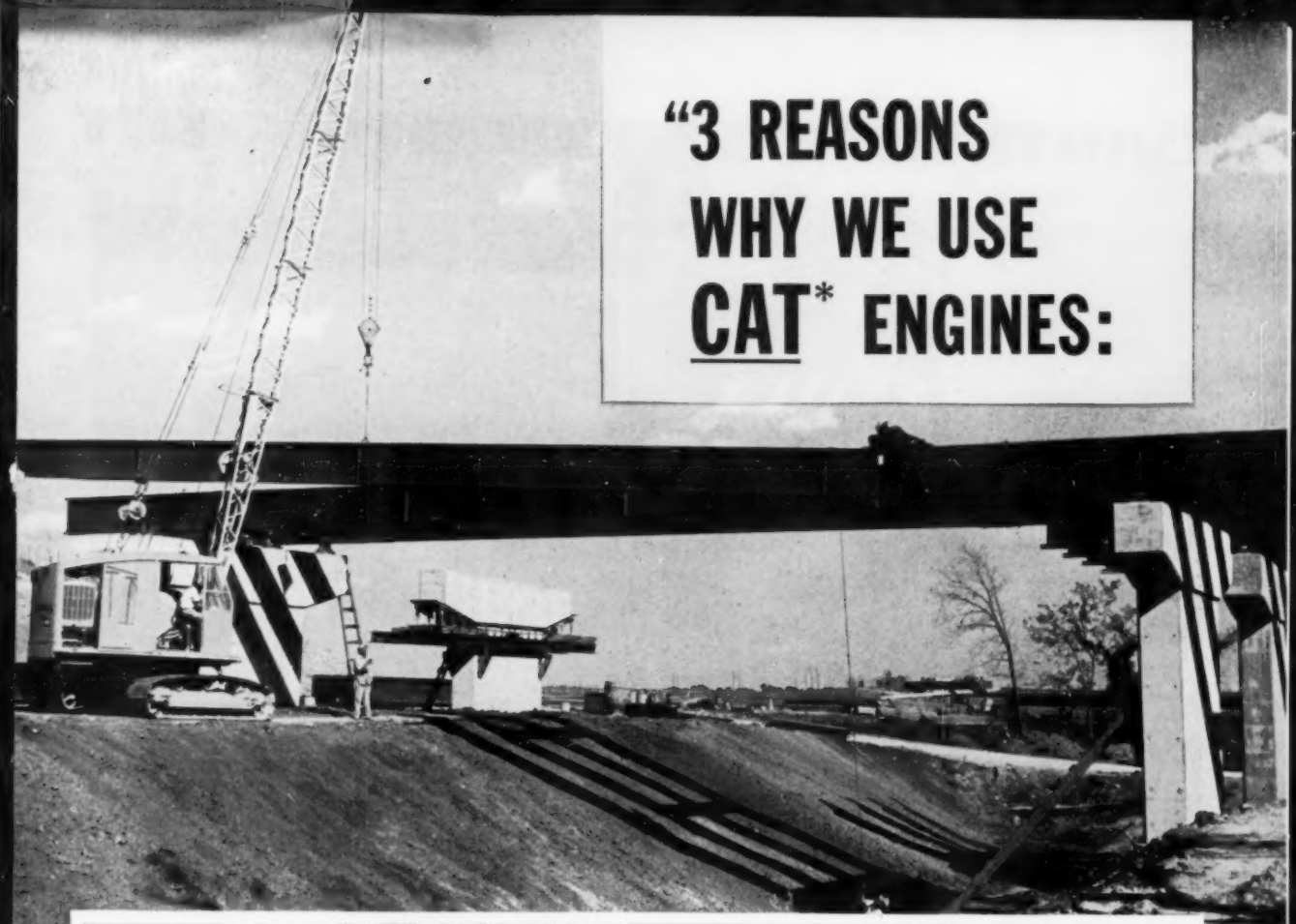
ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS

. . . for more details circle 197, page 16

"3 REASONS WHY WE USE CAT* ENGINES:



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3 Operators prefer Cat power to work with."

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Maxwell Bridge Co.

THOSE three reasons tell why Maxwell Bridge Co., of Columbus, Kansas, powers its cranes and excavators with Caterpillar Diesel Engines. The Koehring Crane shown here, placing I-beams for a bridge 5 miles west of Emporia, is one of 12 machines owned by Maxwell. Its engine? A Caterpillar D318, with well over 4000 hours on the meter.

Operators who have worked for this company from 8 to 25 years are particular about their power. Busy all year around, each man services his own machine. Naturally they want an engine that stays on the job without tinkering—and when they're asked to name their preference, they choose Caterpillar.

Most manufacturers of excavating equipment can supply Cat Diesels as original power. Or Caterpillar Dealers are ready to install these dependable engines as replacement power. A full line of engines is available. The D318, for example, is rated at 137 HP (maximum) at 2000 RPM.

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MODERN HEAVY-DUTY DIESEL ENGINES

. . . for more details circle 184, page 16

One of the many Barber-Greene BatchOmatic Asphalt Plants setting new low cost production records in the United States and Canada.

Now . . . two, four and six thousand pound Barber-Greene BatchOmatic plants

Less than a year ago Barber-Greene introduced the revolutionary BatchOmatic—the first plant ever designed from its original conception for completely automatic operation. In that short time the success of this batch plant has been established all over the United States and Canada. Owners and operators everywhere report that the automatic operation has reduced their costs, increased production and expanded their market. Inspectors find that the BatchOmatic consistently produces mixes to specification with automatic accuracy.

Now the Barber-Greene BatchOmatic is available in three sizes: two, four and six thousand pounds.

Now you can choose the capacity that best meets your needs and get the money-making design features that lead the field . . .

Simultaneous weighing of all sizes of aggregate . . . to eliminate the human element in achieving accuracy and maximum capacity.

Instant change-over from automatic to manual operation . . . to provide mixes for the drive-in trade . . . instantly reset to preset repetitive cycle operation.

New Dyna-Mix pugmill . . . to give more thorough coating in less time than any other pugmill.

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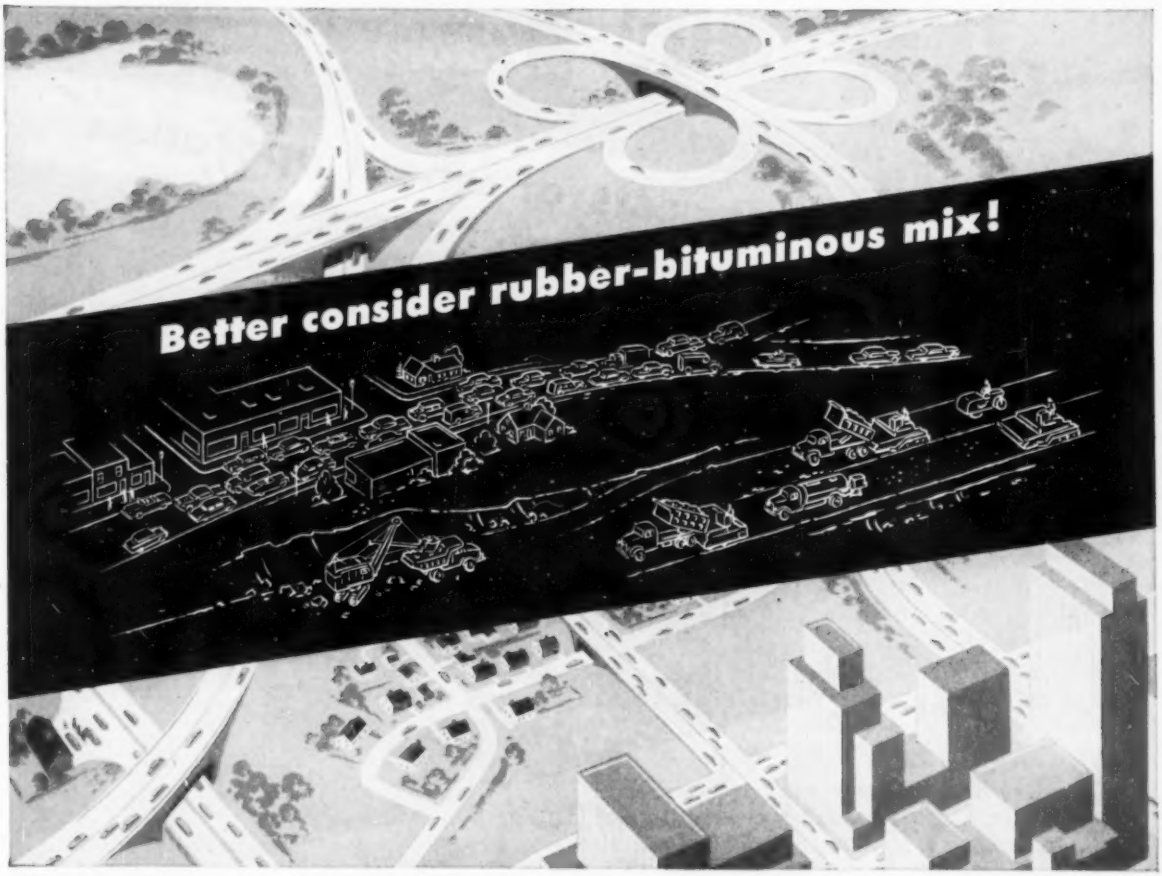
CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

. . . for more details circle 179, page 16

PLANNING YOUR ROADS FOR "FUTURE" TRAFFIC?



In the next ten years you should see some 20 million more cars on the road. This means bigger problems in maintenance, particularly if main streams of traffic have to be re-routed through your community. And one of the most efficient and economical methods of minimizing maintenance problems and increasing the load-carrying capacity of roads is to use Surfa-Sealz.

Surfa-Sealz was specifically developed to eliminate the usual problems in obtaining a rubber-bituminous mix. You don't need to worry about a hot pre-mix or a specially equipped plant. Surfa-Sealz makes every hot mix plant a potential rubber mix producer. And what's more, Surfa-Sealz will not clog or interfere with the operation of conventional equipment.

SEE—Naugatuck Chemical Division, United States Rubber Company, at work on NBC's "Color Spread" TV spectacular, Sunday, March 25, 7:30 PM, EST.

Surfa-Sealz will bind the asphalt to the aggregate and prevent the asphalt from bleeding to the road surface. This will minimize water penetration, cracking and pot holes.

Surfa-Sealz will stabilize the asphalt by holding in the mix those volatiles which keep the asphalt pliable and resistant to embrittlement. It prolongs pavement life. Try it in your mix. Examine it! Try penetration tests over a period of time and see for yourself how Surfa-Sealz keeps your pavement resilient and stable longer.

For sample Surfa-Sealz®, technical information, and current performance reports, write to us, TODAY.

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. . . for more details circle 232, page 16

● The Blaw-Knox Bituminous Paver Finisher has demonstrated conclusively the superiority of wheel mounting for laying asphaltic concrete mixes. After its preliminary testing and development period and only two years on the market, more than 30 states have approved it for state highway work. Month by month the list continues to grow and with it the number of contractors who are getting a *better surface at higher speed and lower cost.*

Rubber tire mounting definitely reduces the time required for returning the machine for restarts. Long wheelbase and accuracy of steering, possible only with wheels, produce a smooth ripple-free surface under the straight edge and even control on curves.

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- ✓ Eliminates the 500 to 600 parts characteristic of crawlers.
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- ✓ Simple, easy crown adjustment.
- ✓ Dual controls—operate machine from either side.
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- ✓ Conversion for increased width is easy and fast.
- ✓ Works close to curb.

On wheels it will pave for less

BLAW-KNOX COMPANY
Construction Equipment Division
MATTOON, ILLINOIS

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the man at the controls will tell you...

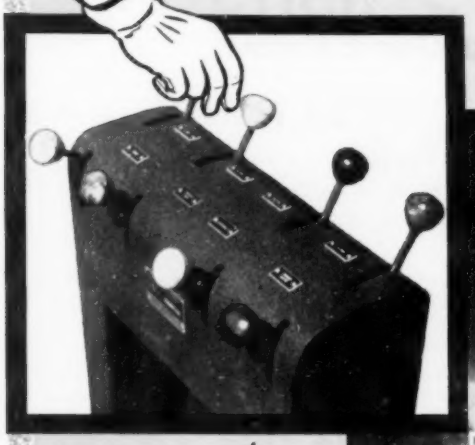
The MADSEN MODEL 481

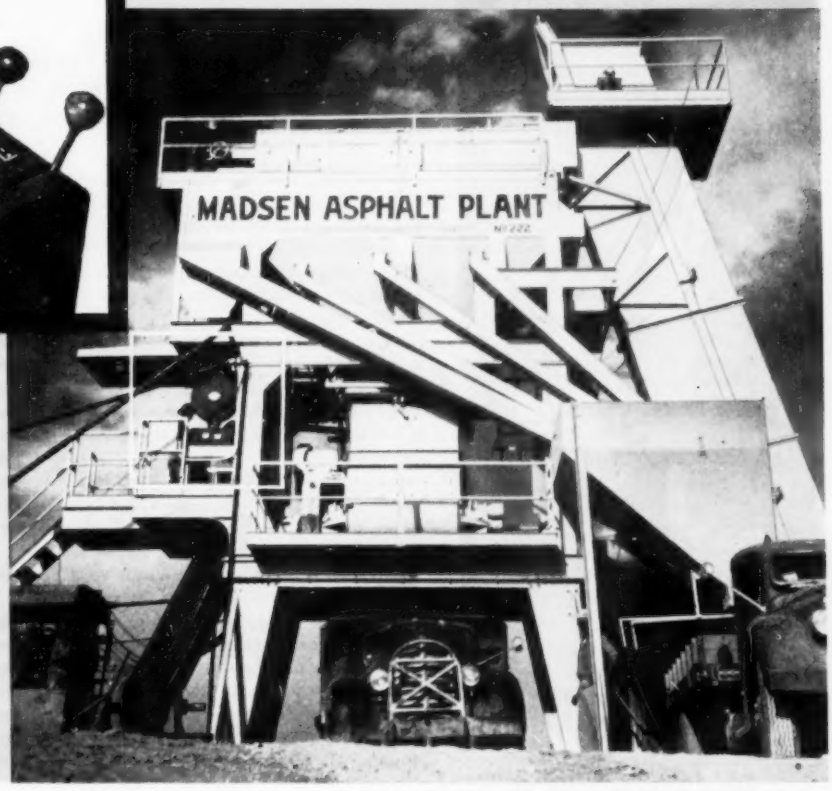
ASPHALT PLANT

1 ...is easier, less tiring to operate!

2 ...mixes faster, more thoroughly!

3 ...turns out more tonnage per 8-hour day!





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HELPING TO BUILD THE HIGHWAYS OF THE WORLD — MADSEN — 1910

No one gets the "feel" of an asphalt plant like the operator himself. That's why you'll find the men who operate the MADSEN Model 481 Asphalt Plants so enthusiastic in their praise for this outstanding plant.

The MADSEN Model 481 is an easy plant to operate. Weighing and mixing controls are conveniently located for finger-tip action. These eight switch levers (shown in the inset view above) electrically energize the 4-way solenoid-operated air valves which open and close the various gates and the asphalt injection. Because air operation is simple and easy for the operator, it reduces his fatigue thereby increasing his efficiency. And, air operation is fast and accurate which decreases time cycle from bin to truck.

Another original MADSEN feature which the operator likes in this MADSEN plant is the location of the operator station on the end of the plant away from fumes and heat where he has an unobstructed view of in-coming and out-going trucks.

The MADSEN Model 440 Twin-Shaft Pug Mill Mixer used in the Model 481 combined with the MADSEN Asphalt Pressure Injection System (Patented)... gives the operator the means of getting the fastest and most thorough mixing action known to the asphalt paving industry.

Talk to the man who has operated the MADSEN Model 481 and check all of the engineering and mechanical advantages of this outstanding plant... it's the asphalt plant you will want for the big road-building years ahead.

DO YOU HAVE A COPY OF BULLETIN No. 800... describing the MADSEN Model 481 Asphalt Plant in detail? If not — ask for your copy today.

BLH — Construction Equipment Division

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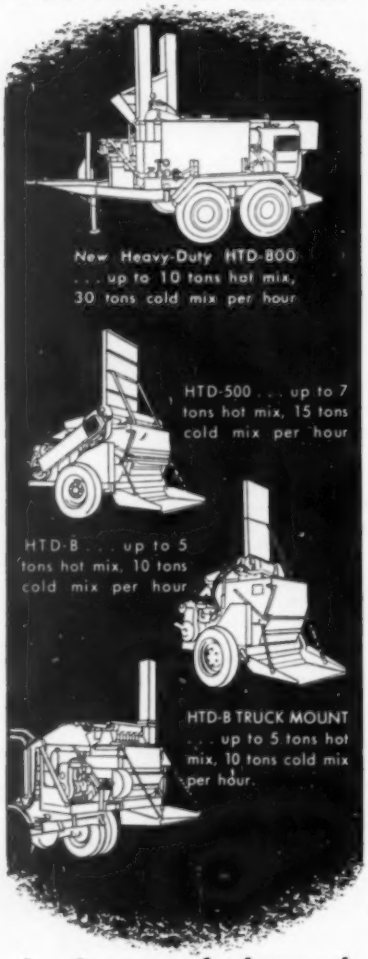
McConnaughay
HOT ASPHALT MIXERS


New Heavy-Duty HTD-800
. . . up to 10 tons hot mix,
30 tons cold mix per hour
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tons hot mix, 15 tons
cold mix per hour
HTD-B . . . up to 5
tons hot mix, 10 tons
cold mix per hour
HTD-B TRUCK MOUNT
. . . up to 5 tons hot
mix, 10 tons cold mix
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. . . for resurfacing and patching in any season

Designed for economy of operation and fast production, the McConnaughay line of Asphalt Mixers meets every need for most resurfacing as well as all types of pavement patching. Working on location, McConnaughay HTD Mixers provide the *exact amounts* of materials needed and effectively remove both moisture and solvents from bituminous mixtures. . . positive assurance that patches and resurfaced areas will set up hard. For details and specifications on the mixers above and on the JR and HTD-LP models (not illustrated), write, wire or 'phone. . .

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VIEWS AND COMMENTS

What You Don't Know WILL Hurt You

By H. G. Nevitt

A QUESTION on soil stabilization recently posed to us has wide implications. The state concerned has a considerable area of sandy soil with little coarse aggregate — an obvious place for soil stabilization. Laboratory studies by their usual design method — one widely used — show good results from mechanical stabilization, poor from the usual asphalts. Projects built with gradation improvement some years ago are not, however, doing too well.

Meanwhile, limited asphalt stabilization in other areas is making a good showing. Likewise, asphalt stabilization of similar soils in other states are reportedly doing well. Hence the question as to why the field results seem to contradict their laboratory findings, particularly since their design method has not appeared lacking on the usual project. To this might be added the question as to what should be done by highway engineers when faced with such a situation.

A conclusive answer would obviously require detailed study. With this, however, we doubt if the experts would agree on the answers to these questions. We will merely express our own view. This is essentially that the above situation is simply evidence of the point we have been recently making, that present testing techniques do not duplicate the actual mechanism of resistance by the road structure in use. Empirically found correlations may hold approximately over a certain range of characteristics, or for certain types of structure, but they fail for others. And we think this situation is exacting a heavy penalty not always recognized.

Present methods have certain implied assumptions. They predict the same — that is, satisfactory — results from structures showing the same stress resistance in the laboratory, at least when these values lie in the acceptable range which has presumably been correlated with road performance. The implication is that the strains corresponding to these stresses are the same; or if not, that it is immaterial. We believe the above to be incorrect. We think the mechanism of failure has significance, and the strains resulting from different types of resistance likewise. Deformations from frictional resistance, and those from true cohesive resistance, sufficiently affect the resistance mechanism as to result in different final bearing values, even though laboratory tests of two structures differing in these characteristics may show the same.

Whether or not this thinking is correct, certain practical facts are known. Highly cohesive mats and bases, characteristic of certain types of bituminous construction, have shown far greater actual load carrying ability than those depending on either rigid or purely frictional resistance. The ratings given such structures by the various test techniques vary, but rarely come up to the results in the field. At the same time such surfaces must be distinguished from the plastic ones which cause so much trouble. We plan to discuss the implications from this situation next month.

Summing up, we believe that present design methods, to varying extent, fail to measure the traffic-carrying value of certain types of bituminous structures. If so, this present lack of knowledge and ability to predict the true bearing value of such surfaces is carrying a costly penalty. We need to offset this lack as best we can. At the same time we need to develop the required knowledge of the actual mechanism of resistance displayed by such surfaces. For on this depends to a considerable extent our efficiency in performing our function of giving the most for the money available.

USE AND TESTING OF

Asphalt Coating Additives

By L. T. Crews and M. L. Kalinowski

Research Department,
Standard Oil Company (Indiana), Whiting, Indiana

Field experience on road construction jobs points out three advantages to be gained from the use of additives in asphalts: improved coating of wet aggregate by asphalt, improved stripping resistance of the coated aggregate, and faster paving. Additives also improve flexibility and workability of stock-pile mix for winter patching, improve durability of seal coatings, and possibly reduce susceptibility of the finished road to frost damage.

Two new tests offer promise of a more realistic appraisal of additive performance than is provided by customary laboratory procedures. A Mechanical-Mixing Test, based on mixing aggregate and asphalt under conditions similar to those used in actual practice, correlates well with observed field performance. A Mechanical-Sieving Test, based on the principle that particles of well coated aggregate adhere to each other and do not pass through a coarse sieve, is especially useful for evaluating partially coated aggregates.

A good additive should be effective on both acidic and alkaline aggregates, be completely miscible with the asphalt, have good heat stability, and have little or no effect on asphalt inspection tests.

OVER nine million tons of road oils, cutback asphalts, and penetration-grade asphalts derived from petroleum residuums or tars are used annually in the United States. The primary use of these products is for surfacing highways and airport runways. Because asphalts cannot be satisfactorily applied to wet aggregates, wet weather frequently limits the time available for construction. Roads made under adverse conditions often must be rebuilt. Although wet aggregate can sometimes be dried prior to use, severe stripping of the asphalt from the stone may occur in the event of rainfall on an uncured road mat.

In 1937, McLeod[1] showed that the addition of sodium oleate to liquid asphalts enabled them to preferentially coat wet alkaline aggregates, such as limestone, and also wet acidic aggregates, such as gravel, if they are pretreated with an activator. Several additives are now commercially available; some are effective on all types of wet aggregate without pretreatment.

Little has been published about the beneficial effects of additives in actual road-building practice. Often they have been used in a hit-or-miss fashion. The important problem of predicting field performance of additives from bench-scale laboratory tests has been almost entirely overlooked.

Advantages of Additives

In the building of roads with asphalts, many advantages can be gained by the use of additives. Advantages that have been proved on test roads include improved coating of the aggregate and resistance to stripping, faster paving, easier handling of stock-pile material during cold weather, and more-durable seal coating. Higher resistance to frost damage is also indicated.

Improved Coating and Resistance to Stripping

When asphalt is applied to wet aggregate in the absence of an additive, the coating simply envelops the wet particles with a layer of asphalt. Because a film of water is present between the aggregate surface and the asphalt coating, the mix strips extensively upon further contact with water. The problem is worse with a hydrophilic aggregate; although it may be visibly dry and good coating is readily obtained, stripping occurs through preferential wetting of the surface by the water.

Whenever a wet or a hydrophilic aggregate is used, additives can be employed with outstanding success. Three roads were made in one county in Michigan in 1947 with the same equipment, aggregate, and grade of road oil; by the same method; and under like conditions of wetness. Two of the roads were made without an additive during a prolonged rainy period. The third was made in a later rainy period, but, because of poor quality of the first two, an additive was mixed with the road oil in the field.

Figure 1 shows typical scenes along one of the roads laid without additive. The lack of proper distribution and coating resulted in rich and lean areas. The rich areas remained soft and tended to bleed, shove, and washboard. Lean areas were so poorly bonded that portions fell apart under traffic.

In contrast, Figure 2 shows a stretch of the road made with the additive. This road was free of imperfections and was still giving satisfactory service eight years later.

Rich area, shoving

Lean area, holes

Rich area, washboarding

Uneven distribution

● Figure 1. Road laid with wet aggregate — no additive used.

With either blades or a paving machine, an additive in the asphalt shortens the mixing time for a satisfactorily coated paving mix. Construction can therefore be completed with savings in overhead and labor costs.

A contractor in Indiana was able to operate his paving machine at a rate of 100 tons per hour with wet aggregate because of the presence of an additive in the cutback. The design rate was 60 tons per hour. Despite the high throughput, complete coating of the mix was obtained and an excellent road mat was laid out. The job was completed well ahead of schedule.

Easier Handling of Stock-Pile Material

Growing experience indicates that additives are beneficial in the handling of stock-pile mixes during winter road patching. During the winter of 1953, two experimental stock piles, one of which contained an additive, were being used for repair work on a heavily traveled road in Indiana. The temperature was 34°F. and the holes to be patched were filled with water and ice. The mix containing the additive shoveled easily and rolled out readily, whereas the non-additive mix was stiff and friable and extremely difficult to handle. Under the action of traffic, the additive-containing patches held up well, but extensive repatching was necessary where non-additive material was used. Similar experiences have been reported by other road-builders.

More-Durable Seal Coating

Road builders have found that additives improve the durability of seal coatings. For example, during the fall of 1952 a road in Colorado was seal-coated with RC-3 and crushed hydrophylic stone. One section was made with additive and one without. A heavy snow fell the day after the job was completed. The section coated with cutback containing additive retained its surface stone; the other section had to be resurfaced. Other seal coat jobs in various sections of the country have benefitted from the use of an additive.

Higher Resistance to Frost Damage

The mechanism of frost damage is not known. However, water seems to accumulate and freeze beneath or in the road mat, and thawing in the spring is followed by a characteristic heaving action that leads to complete disintegration of large sections of the road[2]. Typical frost damage is illustrated in Figure 3. If accumulation of water beneath or in the road mat could be prevented, frost damage could probably be minimized.

During the spring of 1951, frost damage on midwestern roads made with liquid asphalts fortified with an additive was less frequent than on roads made without an additive. In most instances, a check of other factors that might contribute to frost damage eliminated road age, aggregate type, base condition, and drainage or other topographical features as the causes.

An additive-containing road may suffer less frost damage because it is water-repellent and because the stronger bond of aggregate to asphalt makes it more impervious to infiltration of water.

Laboratory Evaluation of Additives

From the viewpoints of both the user and the refiner, additives should be effective on all types of stone, so that shipments can be made to areas where widely differing aggregates are used. Even within a single county, both limestone and gravel may be employed. Accordingly, a way is needed for predicting field performance with any type of aggregate in the laboratory. Many tests are available, but most were designed by various state highway commissions to fit a set of local conditions and are not universally applicable.

The lack of applicability of the existing methods was demonstrated recently in a field-scale test program in which fifty experimental road mats were made with a Moto-Paver paving machine. The Moto-Paver was operated according to accepted practice with respect to rate of mixing, composition of the mix, and temperature of application. Such operation provided asphalt-aggregate mixes

with coating and stripping resistance similar to those which would be obtained in actual road building. In the program, ten additives of different chemical composition were tested with both acidic and basic aggregates. To obtain comparable results, moisture content and size of aggregate were carefully controlled. The performance of these field mixes was then compared with the results of usual laboratory tests. The correlation was poor, particularly when any single test was compared with field performance.

The usual laboratory tests suggest that many commercial additives would be effective either on acidic or on alkaline aggregates, but not on both. The performance of twelve additives has been studied by a typical coating test and a typical stripping test. For this study, the Colorado Coating Test was extended to crushed limestone. The results are given in Table I.

For more-accurate appraisal in the laboratory, the additive would have to be subjected to several of the usual tests and evaluated in over-all performance, rather than on the basis of any single test. Such a procedure is tedious. A realistic laboratory test is needed that is simple and that would give a reliable evaluation of additive performance.

A new test called the Mechanical Mixing Test offers promise of a more realistic appraisal of additive performance than is provided by customary laboratory procedures. Also, a Mechanical Sieving Test has been devised that is especially useful for evaluating partially coated aggregates in the 80% range which is often considered as the minimum for satisfactory performance.

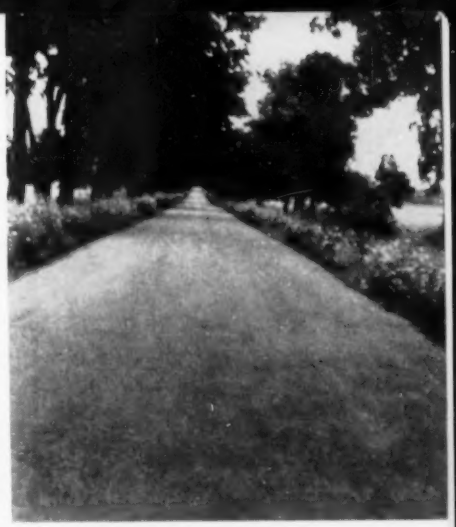
Mechanical Mixing Test

The Mechanical-Mixing Test is based on mixing aggregate and asphalt under conditions similar to those used in actual practice. It gives data that correlate well with observed field performance and is believed to meet the requirements for a single test. The equipment used in this test is shown in Figure 4. It consists of a mixer equipped with a special bowl, mixing paddle, and scraper blade, as described by the Bureau of Public Roads[5].

For testing liquid asphalts of low or medium viscosity, 500 grams of dried aggregate is thoroughly mixed with 25 g. of distilled water and allowed to stand for two hours in a covered container. The wet aggregate is remixed and 25 g. of fortified asphalt is added. The sample is transferred to the mixer bowl and mixed for 3 minutes with the machine set for the slowest speed. The fresh mix is evaluated visually for per cent coating. A sample of the mix is cured for 24 hours at 75°F. and placed under distilled water at 120°F. for 24 hours. The per cent coating is again estimated; this value is called the stripping resistance.

Data obtained by this method for ten commercial additives in liquid asphalt are given in Table II. Additives C, D, and E show excellent coating and stripping resistance on the wide variety of aggregates tested. The other additives show good performance on some but poor on others. Additive J actually shows poorer coating than the control and little improvement in stripping resistance.

The test can also be applied to heavier grades of asphalts by preheating the stone, asphalt, and mixing bowl to the temperature recommended for use of the asphalt. A stripping temperature of 140°F. is recommended for these materials. Table III shows the benefits to be derived from using additives with penetration grade asphalts. Evidently heating to 250°F. does not remove all the moisture from hydrophylic aggregate, as shown by the severe stripping of the control.



● Figure 2. Road laid with wet aggregate — additive used.

Mechanical-Sieving Test

The Mechanical-Sieving Test is a modification of the Colorado Coating Test and is based on the principle that particles of well-coated aggregate adhere to each other and do not pass through a coarse sieve. It is useful as a quick check on the additive content of asphalts. The procedure involves a coating step and a sieving step. The latter eliminates the uncertainty of visual evaluation. Three factors make an accurate visual estimation of coating difficult: Some additives promote coating that looks brown; others give jet-black coatings. Some additives give what appears to be good coating, but cohension or bonding of the aggregate particles is poor. Some aggregates are so dark in color that visual estimation of coating is almost impossible. The asphalt manufacturer needs a non-visual test for evaluating experimental additives and for inspecting asphalts containing additive before shipment.

To prepare test samples of an additive-containing asphalt with an acidic aggregate, twenty grams of Ottawa sand is weighed into a 2-ounce jar and covered with one-half inch of distilled water. One gram of the test asphalt is added and the jar is capped. The temperature of the jar and contents is adjusted to suit the viscosity grade of the liquid asphalt to be tested: 70°F. for 1 and 2 grades, 100°F. for 3 grade, and 130° F. for 4 and 5 grades. The jar is

Table I — Coating and Stripping Percentage as Measured by Usual Laboratory Tests

(Additive Used in MC-2 at Maximum Concentration Recommended by Manufacturer)

	FRESH MIXES			AFTER 24 HOURS AT 220°F.	
	Coating Test[a]		*Stripping Test*[b]	*Coating Test*[a]	
Additive in MC-2	Ottawa Sand	Thornton, Illinois, Limestone	Lander, Wyoming, Chips	Ottawa Sand	Thornton, Illinois, Limestone
None	0	0	10	0	0
A	100	90	45	90	85
B	100	10	95	100	10
C	100	90	85	100	90
D	100	90	95	100	90
E	80	90	50	40	20
F	95	40	40	85	75
G	90	80	75	50	80
H	90	40	45	80	20
I	100	90	65	80	80
J	95	5	75	5	5
K	100	55	100	100	80
L	85	80	100	85	80

[a] Colorado State Highway Department Procedure.
[b] Wyoming State Highway Department Procedure.

● Figure 3. Frost damage.

shaken vigorously by hand for 30 seconds.

The equipment used in the sieving step is shown in Figure 5. A Tyler No. 6 sieve is attached to the bottom pan and the joint is sealed tightly with a rubber ring. Tap water at 70 ± 5°F. is poured in the sieve up to one inch from the top. The contents of the jar are poured onto the screen and the assembly is shaken on a Cenco-Meinzer mechanical sieve shaker for one minute at 300 to 325 cycles per minute. After the shaking period, the water is decanted and the bottom pan is detached. The mix in the bottom pan is scraped together with a spatula, transferred to a filter paper, and weighed immediately to the nearest tenth of a gram. Because some moisture is occluded, poorly coated samples may give more than 20 grams of screenings.

In testing an additive for alkaline aggregates, 20-35-mesh crushed limestone is substituted for the Ottawa sand. The porous structure of limestone apparently absorbs more asphalt than sand does and causes poorer bonding with a given amount of asphalt. For this reason, to distinguish between good and poor coatings on limestone, a No. 20 sieve is used. Numerical values for visual ratings with alkaline aggregates were obtained with the Mechanical-Mixing Test.

Figure 6 shows the performance of additive-containing asphalts with both acidic and alkaline aggregates. Fifteen additives and six liquid asphalts are represented. All samples estimated visually to be at least 80% coated gave less than 5 grams of screenings. There is a sharp increase in the amount of screenings in the range of 75-80% coated.

Table II — Coating and Stripping Data Obtained by The Mechanical-Mixing Test With Liquid Asphalt

In each column, left numbers designate percent coating of fresh mix; right numbers designate per cent coating retained after stripping of cured mix.

Additives Used in MC-2 at Maximum Concentration Recommended by Manufacturer

Additive	ALKALINE AGGREGATES			ACIDIC AGGREGATES		
	Converse, Indiana, Limestone	Thornton, Illinois, Limestone	Virginia Dolomite	Indiana Gravel	Massachusetts Rhyolite	Lander, Wyoming, Chips
None	60-5	50-15	35-5	55-10	50-5	50-5
A	90-85	85-75	85-60	70-55	95-30	60-35
B	50-40	80-50	75-30	80-60	100-70	70-65
C	100-90	100-80	100-80	90-80	100-80	90-90
D	95-95	95-95	100-95	100-100	95-95	90-90
E	95-95	100-95	100-85	95-95	85-60	80-80
F	80-80	85-75	75-30	65-20	85-40	60-20
G	75-75	95-80	90-65	75-50	85-70	70-30
H	50-75	75-50	75-40	65-30	60-40	50-10
I	75-75	90-80	75-50	75-35	75-45	70-50
J	30-30	40-40	25-10	35-30	75-60	40-10

Table III — Coating and Stripping Data Obtained by The Mechanical-Mixing Test With Penetration Grade Asphalt

Additives Used at Maximum Concentration Recommended by Manufacturer.

Mixes made at 250°F. with 4% of 85-100-penetration paving asphalt and 96% air-dried Lander, Wyoming, chips.

Additive	% Initial Coating	% COATING AFTER STRIPPING AT		
		100°F.	120°F.	140°F.
None	100	75	30	10
B	100	100	100	100
K	100	100	100	100
L	100	100	100	100

Use of Modern Asphalts

Although the primary purpose of an additive is to improve coating and stripping resistance, the additive should possess certain other properties for satisfactory use and ease of handling.

In asphalt blends, additives should resist heat degradation and subsequent loss of coating efficiency and stripping resistance. This need is dictated by two common practices: (a) holding additive-fortified blends of liquid asphalt in refinery or field storage for several weeks at 150° to 175° F., and (b) heating the asphalt blend to application temperatures of about 250°F. Table IV shows the heat stability of three commercially available additives in liquid asphalt. Coating efficiency on one type of stone often degrades more rapidly than it does on the other. Resistance to stripping appears to be more subject to heat degradation than is coating efficiency. Similar results are obtained with fortified penetration-grade asphalts stored at elevated temperature. Coating data for these are given in Table V. Some fortified asphalts show increased efficiency during early stages of hot storage.

Additives should be readily and completely miscible with asphalts. Otherwise, sedimentation could occur if fortified asphalts are stored at high temperatures.

Most asphalt users desire that additives have little or no effect on the inspection tests of the asphalts. The properties most commonly affected are the spot test, solubility in carbon tetrachloride, and penetration of the distillation residue. Additives may also interfere with the ASTM distillation test. Although an additive may cause the results of inspection tests to fall outside the perscribed range, the blend may perform satisfactorily in

● Figure 4. Mechanical mixer.

the field and produce an excellent road, even when laid under adverse conditions. This performance has been demonstrated on several roads now seven or eight years old.

The growing appreciation of the beneficial effects of additives will inevitably increase usage of fortified asphalts. The use of additives assures construction of better roads and provides inexpensive insurance against costly down-time during wet weather.

The authors appreciate the help received from J. W. VanWyk and the late F. H. MacLaren. The assistance of F. L. Pilar and J. H. Krause in developing the Mechanical - Mixing and Mechanical-Sieving Tests is also gratefully acknowledged.

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2. Highway Research Board, "Frost Action in Soils," Special Report Nos. 1 and 2, Washington, D. C., 1952.
3. Pauls, J. T., and Peck, R. A., Proc. Assoc. Asphalt Paving Technol., 19, 395-410 (1950).
4. Colorado State Highway Department, "Standard Specifications for Road and Bridge Construction," January 1, 1950.
5. Wyoming State Highway Department, "Special Specification for Asphaltic Material Additives," February 17, 1950.

Oregon trainees

Pictured here is a group of sub-professionals who are taking the Oregon highway department's training program. This department puts an average of 258 high school students per year through the mill. To obtain

Table IV — Heat Stability At 220°F. of MC-2 Cutback Asphalt Fortified With Additives

Additives Used at Maximum Concentration Recommended by Manufacturer. Coating, Colorado State Procedure

	ADDITIVE A		ADDITIVE B		ADDITIVE C	
	Ottawa Sand	Thornton, Illinois, Limestone	Ottawa Sand	Thornton, Illinois, Limestone	Ottawa Sand	Thornton, Illinois, Limestone
Initial	95	90	100	5	90	90
1 day	85	90	95	5	90	90
2 days	80	80	95	5	90	85
3 days	70	80	85	5	90	80
4 days	60	80	75	5	90	80
7 days	55	80	60	5	80	80
STRIPPING RESISTANCE,[b] % LANDER, WYOMING CHIPS						
Initial	85		85		85	
1 day	50		50		85	
2 days	45		45		80	
3 days	45		40		80	
4 days	45		40		75	
7 days	10		10		40	

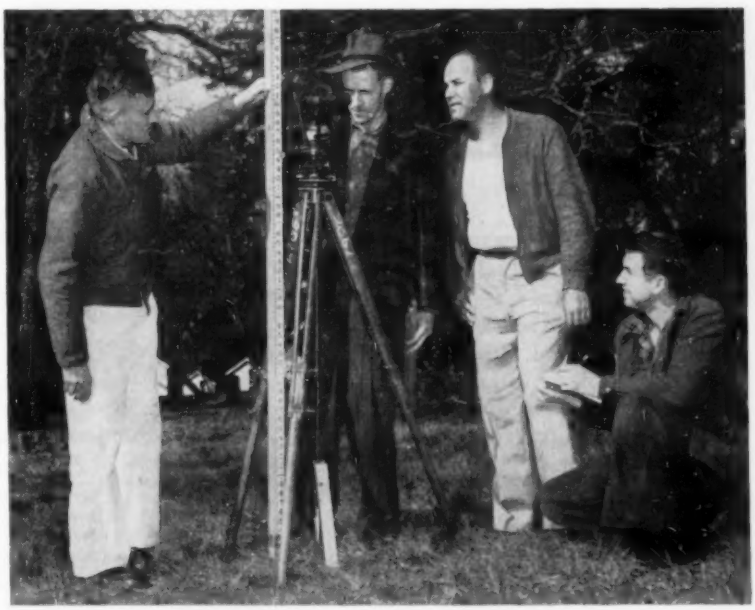
[a] Colorado State Highway Department Procedure (4).
[b] Wyoming State Highway Department Procedure (5).

Table V — Heat Stability At 250°F. of 60-70-Penetration Paving Asphalt Fortified With Additives

Additives Used at Maximum Concentration Recommended by Manufacturer Coating as per Footnote

	ADDITIVE B		ADDITIVE K		ADDITIVE L	
	Ottawa Sand	Thornton, Illinois, Limestone	Ottawa Sand	Thornton, Illinois, Limestone	Ottawa Sand	Thornton, Illinois, Limestone
Initial	75	10	100	55	85	80
1 day	80	10	100	80	85	85
2 days	75	10	95	75	50	90
3 days	65	0	95	70	50	90
4 days	0	0	40	0	10	40

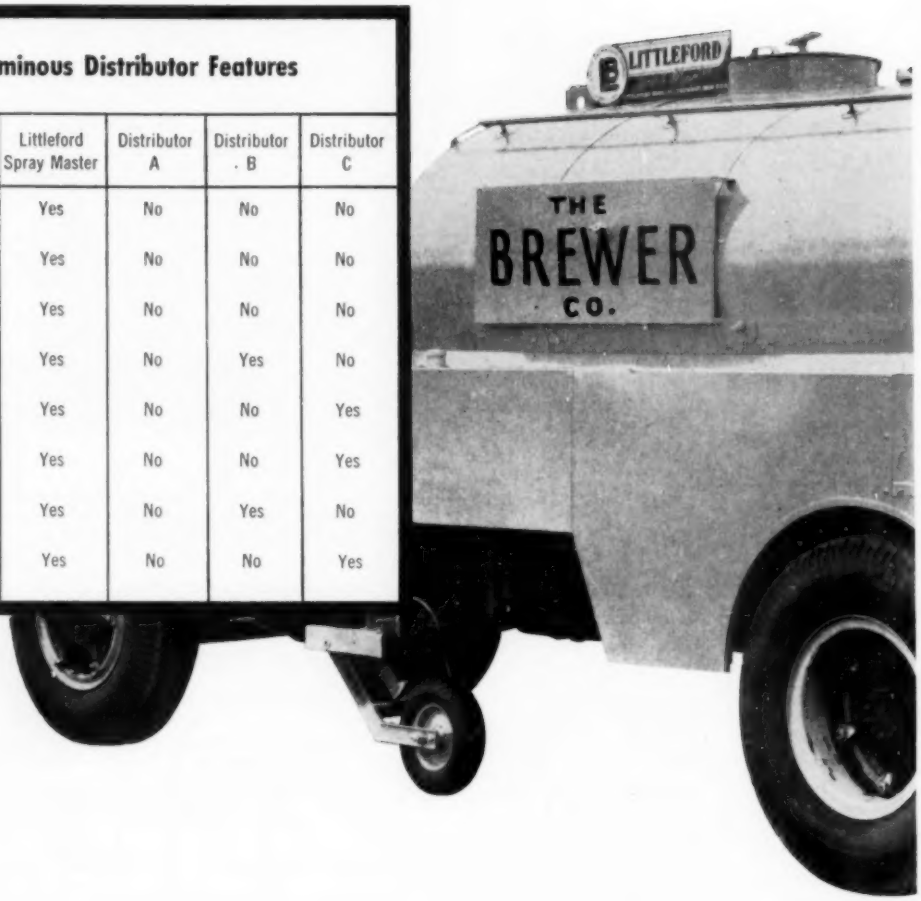
Three parts of fortified paving asphalts diluted with one part of naphtha before testing by Colorado State Highway Department Procedure (4).



● Oregon sub-professional trainees getting lesson in surveying.

Comparison of Bituminous Distributor Features

	Littleford Spray Master	Distributor A	Distributor B	Distributor C
Multi-pass continuous heat flue system?	Yes	No	No	No
Patented damper?	Yes	No	No	No
Air-cooled flue liner?	Yes	No	No	No
Patented single valve control?	Yes	No	Yes	No
Right-angle drive?	Yes	No	No	Yes
4-speed transmission?	Yes	No	No	Yes
Full area circulating spray bar?	Yes	No	Yes	No
Hydraulic spray bar lift?	Yes	No	No	Yes



Contractors compare and find

LITTLEFORD SPRAY MASTER

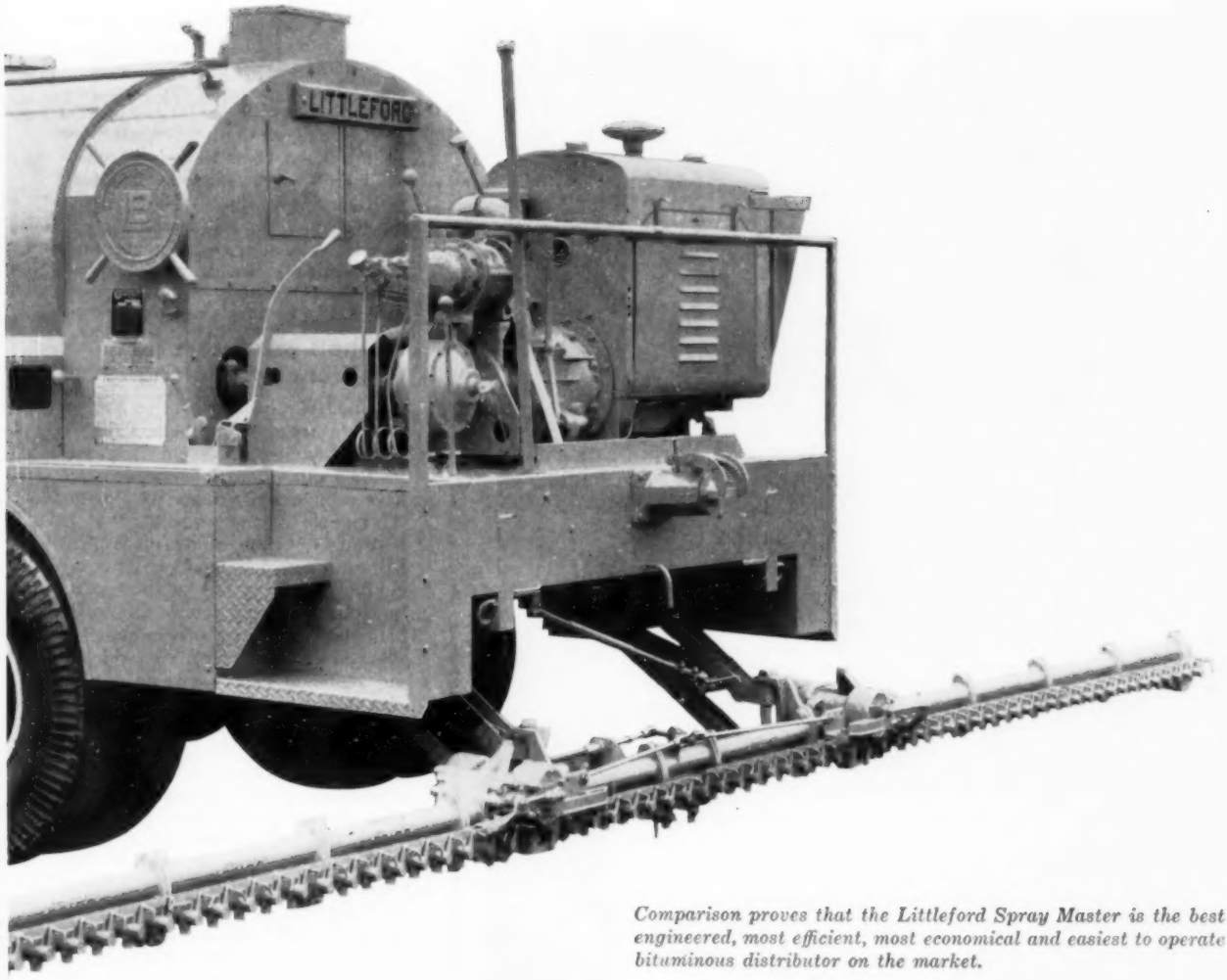
Bill Brewer, of The Brewer Co., Madeira, Ohio, leading asphalt contractors, has two Littleford Spray Masters. Like many other progressive contractors, Bill compared the rest and found Littleford best . . . for the 8 big reasons listed in the chart above.

Contractors everywhere like the exclusive Littleford combination of design, construction and operating advantages that mean better spraying, faster and for less money.

Here are just two of the many time-saving features that will save you up to an hour a day:

(1) patented damper saves 30 minutes on starting time. It shuts off the flues, concentrates heat within the heat chamber, thus heating the pump, main valve and piping faster than any other unit.

(2) 2-section full area spray bar heats to spray temperature faster, saves 5 minutes on every load.



Comparison proves that the Littleford Spray Master is the best engineered, most efficient, most economical and easiest to operate bituminous distributor on the market.

TOPS IN BITUMINOUS DISTRIBUTORS

And the Littleford Spray Master gives you so many operating advantages, you can turn it over to your operators with a minimum of instruction:

- A single patented valve controls spraying, filling, circulating and transferring.
- Hydraulic operated bar lift permits tilting the bar so that it is parallel to road surface despite angle of crown.
- 4-speed transmission with reverse — gives more flexible operation of pump.

There are many other reasons why we say "*compare* Littleford Spray Master, and you'll *buy* Littleford Spray Master." Send today for bulletin 14. Littleford Bros., Inc., 454 E. Pearl St., Cincinnati 2, Ohio.

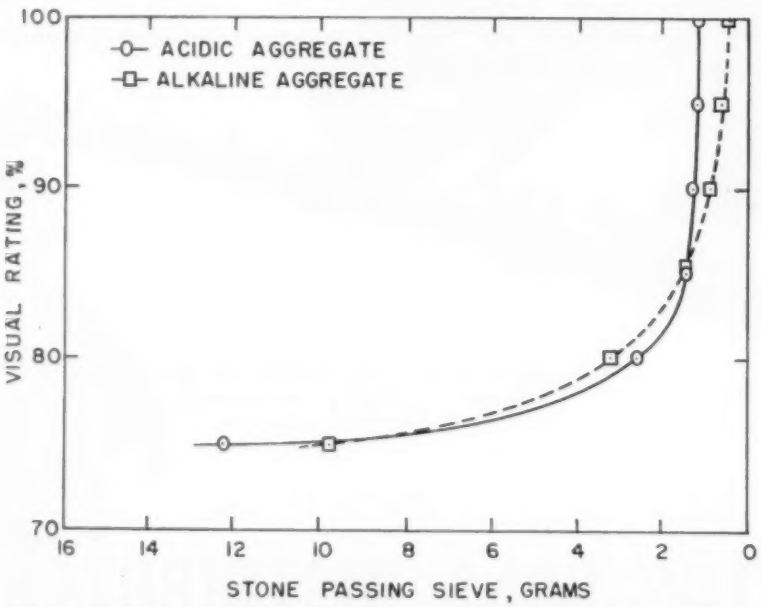
LB LITTLEFORD

BLACK TOP ROAD EQUIPMENT SINCE 1900

TOPS IN BLACK TOP

. . . for more details circle 254, page 16

● Figure 5. Equipment for Mechanical — sieving test.



● Figure 6. Performance of fortified liquid asphalts (Mechanical — sieve testing).

candidates the department sends representatives into the schools on "Career Day."

Trainees start at $250 per month and receive increases to a maximum of $326 per month after 4½ years. After two years of experience, they are eligible to take a written examination to qualify for promotion to Engineering Aide II with a salary range of $310 to $380.

The pay range for beginning professional level position of Civil Engineer I is $360 to $440, according to R. H. Baldock, Oregon state highway engineer, who credits the subprofessional program with greatly helping his organization with its staffing problem.

Top achievements in asphalt are cited

At year-end the Asphalt Institute staff took time out to summarize the outstanding asphalt engineering feats of 1955.

Proclaimed as most important was Maryland's experimental asphalt groins, which proved successful in weathering direct blows of two major hurricanes. Of more interest to highway engineers was the second choice, the Garden State Parkway in New Jersey, which was rated as an outstanding example of modern expressway design, and which has achieved the lowest fatality rate of any such highway — less than one traffic death per 100 million vehicle miles during the first full year of operation.

Third on the list is North Carolina's new asphalt-base construction program. Named also was the publication of the findings of the WASHO test road in Idaho. Chief Engineer Arvin S. Wellborn of the Institute said that while not a technical achievement, the results of the test road confirmed "what we have always known about the surprising strength of an asphalt pavement."

Asphalt producers deny any pending shortage

A poll of directors of The Asphalt Institute, representing most of the asphalt-producing petroleum companies in the United States, are reported to have exploded any rumors of looming shortage of paving asphalt.

A news release from The Asphalt Institute said that member firms are equipped to meet any production requirements in sight due to current or anticipated highway programs.

At the Institute's recent board meeting Sidney Goldin, assistant to the vice president of Shell Oil Co., New York, was elected board chairman of the Institute to succeed Hal B. Pullar, Chicago, board chairman of Berry Asphalt Co. New Institute divisional vice presidents are T. R. Ellis, The Texas Co., New York; Floyd Reed, American Bitumuls & Asphalt Co., Cincinnati; Don Fox, Derby Refining Co., Wichita; Robert Ketcham, Anderson-Prichard Oil Co., Oklahoma City; and Don Nielsen, Union Oil Co. of California, Los Angeles.

Asphalt tonnage sales by member firms of the Institute during 1955 was reported to have risen 16 percent over the record-high year of 1954.

Washington group elects

FRAYNE MCATEE, Spokane, Wash., paving contractor, was elected president of the Asphalt Paving Association of Washington at its first annual meeting recently in Seattle.

Other new officers include C. R. Wilcox, Seattle, vice president, and George Mason, Tacoma, secretary-treasurer. Morris Fahrney of Spokane, Archie Turnbull of Yakima and Sievers were elected to the executive committee.

Carl V. Kilgore, executive secretary of the paving group, announced that the association will give two engineering scholarships of $500 each to Leon M. LaCrosse of Anchorage, who will do graduate work at the University of Washington, and to Thomas Gray of Wenatchee, senior engineering student at Washington State College.

Manufacturers' Literature

Trenchers and Backfillers

The complete line of Cleveland trenchers and backfillers — eight models for a wide variety of applications ranging from small urban trench jobs to huge cross-country pipelines — is described in a 4-page bulletin published by the Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 17, O. Revisions in some of the specifications of the Model 80W Cleveland backfiller constitute the principal difference in text matter between this and the previous full line Cleveland bulletin. The bulletin provides a quick, convenient comparison of the capacities, specifications and dimensions of Cleveland's six trencher models and two backfiller models. Text enumerates special Cleveland design and construction features incorporated in each model. Twenty-seven action photos show the Clevelands at work on all kinds of trenching projects.

For more information circle 129 on Service Coupon Page 16 and mail now.

Aggregate Producers Handbook

The Aggregate Producers Handbook, an entirely new 124-page book, copies of which may be obtained for the asking, has been published by Smith Engineering Works, Milwaukee 1, Wis. This handbook is made up of material collected during a period of many years and was edited by Donald D. Barnes, President of Smith Engineering Works. This helpful handbook contains in one handy quick-reference manual very complete information on aggregates and production machinery including engineering data, very useful tables and charts, all assembled from authoritative sources.

For more information circle 130 on Service Coupon Page 16 and mail now.

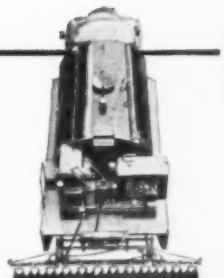
Concrete Paving Vibrators

A new 4-page, 2-color catalog (LL-18T2) descriptive of Hi-lectric concrete paving vibrator attachments and multi-purpose generators has been announced by Maginniss Power Tool Co., Mansfield, O. Complete descriptions of Maginniss Hi-lectric full-slab, side form and pavement widening vibrator attachments are continued. Also included are detailed photos of attachments and components, line sketches, cutaway views and action photos of units in use. Descriptions and illustrations of Hi-lectric generators suitable for use with the various vibrator attachments are shown.

For more information circle 131 on Service Coupon Page 16 and mail now.

Vibrating Screens

A 2-color, 20-page booklet describing their line of Super Service vibrating screens has been published by Pioneer



ROSCO'S PRESSURE METERING MAKES THE DIFFERENCE AT ANY WIDTH!

Do you know . . .

that it's possible to apply bitumen through any length of spraybar from 1 to 24 feet *without changing the pressure and without any application adjustment?* It can be done with a Rosco! You would normally expect surges or drops in pressure to occur when sections of a distributor's spraybar are shut-off or turned on.

But . . .

NOT with a Rosco Distributor equipped with exclusive Pressure Metering. Even when as much as 23 feet of a 24-foot spraybar are shut-off, the precise, accurate delivery remains unaffected . . . the pressure in the working one foot stays the same as it was pre-set at the beginning of the run. The accurate delivery from the working nozzles is not affected . . . no matter how many feet of the bar are cut out.

No adjustments in truck or pump speed are required—in fact, with Pressure Metering the pump speed never changes and normal wear of the pump never affects the accuracy of the application. When any part of the spraybar is shut off, the excess material is automatically by-passed. Pressure at the operating nozzles stays the same. When additional nozzles are turned on, pressure is immediately available to supply them.

One control sets the pressure specified for the job. After that, pressure control is automatic . . . the operator can concentrate full attention to spotting the material properly on the road. Pressure Metering is an integral part of Rosco's patented Master Valve that permits one-lever control of all normal distributor functions. You'll find that Rosco's Pressure Metering is faster and more accurate —factors which can be the difference between a "make" or "break" job in today's highly competitive field. And Rosco's Pressure Metering assures you of jobs that will always meet rigid application specifications.

Let your Rosco dealer show you how Pressure Metering will pay off for you. Or write the factory for descriptive literature with specifications on Pressure Metering-equipped Distributors.

ROSCO BITUMINOUS DISTRIBUTOR with Pressure Metering. Front or rear mounted for truck or trailer.

ROSCO MINNEAPOLIS

3118 SNELLING AVENUE • MINNEAPOLIS 6, MINNESOTA

DISTRIBUTORS • MAINTAINERS • BROOMS
SUPPLY TANKS • TAR KETTLES • STREET FLUSHERS

. . . for more details circle 236, page 16

Engineering Works, Inc., 1515 Central Ave., subsidiary of Poor & Co., Chicago. The Pioneer Super Service line includes eleven standard sizes of single-mounted and four standard combination sizes of tandem-mounted vibrating screens, all adaptable to a wide range of application for screening virtually all types of material. The new booklet is amply illustrated with field pictures and general and detail views of various units and of their construction features. In addition to text material on the screens themselves, supplemented by data tables on their capacities, the booklet has information about washing attachments, spouts, chutes, hoppers, the new (optional) secondary spring suspension feature, screen installation and typical applications.

For more information circle 132 on Service Coupon Page 16 and mail now.

Service and Repair of Tubeless Truck Tires

A detailed review of the servicing, repair and advantages of tubeless truck tires — original equipment on many 1956 trucks — is contained in a timely new 12-page booklet entitled "All You Need to Know About Tubeless Tires for Trucks." Published by The B. F. Goodrich Company Tire and Equipment Division, Akron, Ohio, the booklet is designed to acquaint fleet operators and dealers with the tubeless tire program as a means of improving efficiency of the trucking operation. The booklet is available without charge. How to mount, demount and repair tubeless truck tires is explained at length; recommended rims are described. Photographs or drawings illustrate each topic. The booklet lists the following advantages for tubeless truck tires: weight reduction which permits bigger legal payloads; elimination of tube and flap problems; ease in servicing and repairing.

For more information circle 133 on Service Coupon Page 16 and mail now.

Erosion Control with Gunite

Recognizing the erosion problems resulting from the action of air and water upon raw surfaces of earth and soft rock slopes, the Gunite Contractors Association, Los Angeles, offers a solution in their 4-page bulletin "Erosion Control with Gunite." The bulletin illustrates typical erosion control jobs and details suggested procedures for this type of work. Copies of "Erosion Control with Gunite," designated as Bulletin 125, may be had by writing Gunite Contractors Association, 714 W. Olympic Blvd. Los Angeles 15, Calif.

For more information circle 134 on Service Coupon Page 16 and mail now.

Concrete Breaking Tools

A new folder, available from Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill., gives details on their pneumatic tool accessories for concrete breaking. The tool's curved blade sets up a wedge action, the manufacturer claims, which shatters the concrete; while the tappered point rides free during the breakage, relieved for its main job of penetration.

For more information circle 135 on Service Coupon Page 16 and mail now.

Traffic Warning Lights and Barricades

A new 2-page catalog descriptive of flasher safety light traffic lights and barricades has been issued by R. D. Fagerl Co., P.O. Box 328, Kent, Ohio. The 3-color catalog sheet is illustrated with action photos, line sketches and cutaway drawings. A complete description of flasher safety light construction and operation is given. Also included are specifications covering flasher safety lights and barricades. Typical users are listed.

For more information circle 136 on Service Coupon Page 16 and mail now.

Fluorescent Lamp Ballast

A new 12-page catalog and selection guide covering the company's complete line of fluorescent lamp ballasts is available from General Electric Co., Schenectady 5, N.Y. Designated GEC-983G, the illustrated bulletin contains wiring diagrams for fluorescent lamp ballasting circuits, cross-section dimensions, list prices, and electrical specifications for G-E ballasts. Included are ballasts for general line fluorescents, plastic signs and outdoor applications, dimming and flashing, germicidal fluorescents, rapid-start and circline lamps, and d-c operation.

For more information circle 137 on Service Coupon Page 16 and mail now.

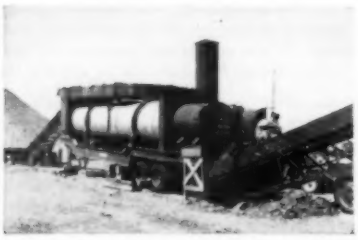
H&B

Presents A New

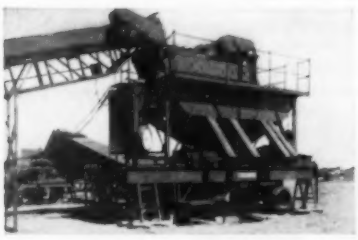
Completely Portable, Batch Type

Asphalt Plant

The H & B Mobile 40 (100-120 TPH Capacity)



Portable Dryer Unit



Gradation Unit, showing operator's platform.

- All Units Wheel Mounted
- No Crane Needed for Erection
- Meets All State Specifications
- All Piping and Wiring permanently installed with quick disconnects.
- All Advantages of Batch Plant
- No Shafts, Universal Joints, Chains, Gears, etc. All remotely located units driven with electric motors.
- Flexible Set-up Arrangement
- Complete Plant (tanks, oil heater, power units, piping, etc.) available from one source.

For complete specifications and information see your H & B distributor or write direct to

HETHERINGTON & BERNER INC.

Engineers • Manufacturers

721 KENTUCKY AVE. INDIANAPOLIS 7, INDIANA

. . . for more details circle 210, page 16

Fittings for Wire Rope and Chain

A complete line of fittings for wire rope and chain is shown in the new 28-page catalog issued by The Thomas Laughlin Division of the American Hoist & Derrick Co., Portland, Maine. Profusely illustrated with product pictures, the catalog includes engineering data and charts for each of the many types of fittings manufactured by The Laughlin Division. Complete information is included on dimensions and safety factors for links, rings, shackles, swivels, hooks, turnbuckles, thimbles, clips, sockets, ring bolts, eyes and load binders.

For more information circle 138 on Service Coupon Page 16 and mail now.

Mapping by Use of Aerial Photography

Mapping by use of aerial photography and photogrammetry and the equipment used in this work is explained and illustrated in a new 8-page brochure "Serving the Engineering Profession." The booklet includes examples of topographic maps of 1-ft. precision, planimetric, photographic mosaic maps and plan and profile sheets as products of the airbourne camera. A copy will be mailed upon request by Abrams Aerial Survey Corporation, Lansing 11, Mich.

For more information circle 139 on Service Coupon Page 16 and mail now.

New High Pressure Sprayers

Three series of high pressure sprayers, specifically designed for low cost brush control and shade tree protection are detailed in a new catalog by John Bean Division, Food Machinery and Chemical Corporation. Spray capacities of the three basic models are 20, 14 and 7 gal. per min. respectively. Optional tank sizes are available — up to 500 gal. capacity for the largest sprayer and up to 200 gal. for the smaller of the series. Highlighted in the new catalog are complete specifications on the John Bean high pressure pumps. For dormant and basal brush control, the Spartan portable power sprayer is shown, as well as an all-purpose knapsack sprayer, recommended for spot brush spraying.

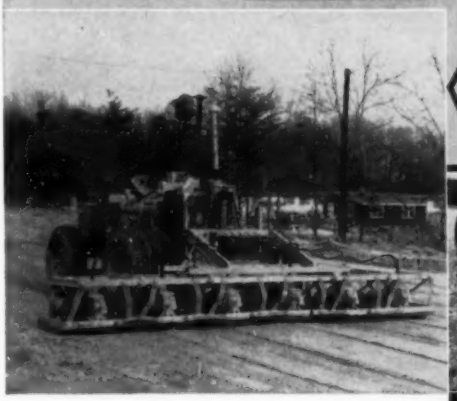
Write for Catalog L-1114 to John Bean Division, Food Machinery and Chemical Corporation, Lansing 4, Mich.

For more information circle 140 on Service Coupon Page 16 and mail now.

Care and Maintenance of V Belts

A 14-page illustrated manual on the care and maintenance of industrial V belts has been published by The B. F. Goodrich Co., Industrial Products Division, Akron, Ohio, and is available without charge. The manual covers the following topics: designing the new drive; double matching; installation of belts; how V belts grip; importance of tension; drive alignment; how to clean; storage. A V belt service chart, which illustrates typical causes of belt failure, is featured.

BASE COURSE DENSIFICATION at its *QUICKEST* and *BEST*



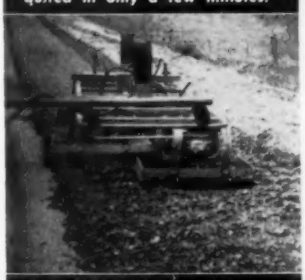
6 COMPACTING UNITS IN WORKHEAD for maximum productivity in straight-away work. Left: Compacting sand fill in a bridge approach . . . another phase of its wide range utility to paving contractors.

4 COMPACTING UNITS just fit this widening job-change required in only a few minutes.

Plus UNMATCHED ON-THE-JOB *ADAPTABILITY!*

For consolidating granular soil sub-bases and the base courses of sand, gravel, rock or slag in waterbound and penetration macadam construction, there is just nothing that compares with the Jackson Vibratory Multiple Compactor. It not only does the straight-away work in only half the time required by equipment of other types, but is so versatile, so easily adaptable on the job that it can be used to great advantage for widening projects of any width and getting into places other equipment can not touch. As may be noted in the illustrations, any number of compacting units may be used in the workhead (up to 6, which covers 13', 3") to exactly fit the job at hand. Units may be towed at the side or fitted with operating handles and used as individual, self-propelling compactors. Quickly interchangeable bases from 12" to 26" are also available for compacting in trenches, etc.

For compacting granular soil fills of all kinds, the Jackson Multiple Compactor is a terrific cost saver and progress expediter. *It's the predominant medium of consolidation used on the outstanding paving jobs in the country today.* See your Jackson distributor for complete details. We will gladly furnish his name, and literature, on request.



3 COMPACTING UNITS in tandem and staggered, suits this job ideally — a quick and easy change.

1 COMPACTING UNIT fitted with operating handle and narrow base. Just right for the otherwise unreachable spots.

2 COMPACTING UNITS in twin hook-up — self-propelling. One man readily compacts up to 4000 sq. ft. per hr. in 10" layers.

JACKSON VIBRATORS, INC.
LUDINGTON, MICHIGAN

. . . for more details circle 221, page 16

Full-scale photographs show what belts look like after failure due to any of the following causes: oil deterioration, cover fabric rupture, slip burn, ply separation, ruptured cords, worn belt sides, snub break, distorted belt, abrasion and base cracking. Ways to prevent these typical causes of belt failure are outlined.

For more information circle 141 on Service Coupon Page 16 and mail now.

Hydraulic Testing Machines Explained

Baldwin-Tate-Emery universal testing machines are presented in a new 12-page Bulletin 4401 by Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa. Hydraulic machines with capacities from 10,000 to 5,000,000 lb. are described, including standard and special types of vertical and horizontal machines. Outstanding feature is an illustrated explanation on hydraulic loading and the independent hydraulic weighing system, which is based on the Emery cell and the precise Tate-Emery null-balance load indicator.

For more information circle 142 on Service Coupon Page 16 and mail now.

Cost Record Book for Truck Operators

Truck operators in every business will be interested in obtaining copies of the revised "Cost Record Book" issued by The White Motor Co. The book provides a comprehensive yet simple system of analyzing truck operating costs and can be tailored to any truck-using business and any size fleet. The system has been adopted by many leading firms throughout the country. It is adaptable to either delivery service, highway operation or off-the-road fleet. A sample copy may be obtained by writing The White Motor Co., Cleveland, Ohio.

For more information circle 143 on Service Coupon Page 16 and mail now.

Striping Machines and Equipment

The latest developments in striping machines and equipment for streets, highways, airports and industry are included in a comprehensive 32-page catalog (W-56), issued by Wald Industries, Inc., Huntingdon, Pa. The new catalog introduces several important additions to the Wald line of "Reflecto-Liner" products — the budget-conscious Model 9 striper, the revolutionary 2-way action "Airomixer" for any type paint, and the Wald "Automatic Sign Shop," a continuous operation that sprays undercoatings and reflective coatings uniformly, then sets them firmly by infrared heat. Signs with greater brilliance and durability are stated to result from this completely automatic process. There is a Wald "Reflecto-Liner" model especially designed and engineered for the varied striping requirements of today's vehicular and aircraft traffic — for highways, rural roads and in-town streets, for industrial plants, and for airports. Each model is illustrated in the catalog, has a complete, clear-cut description of features and specifications, together with a listing of accessories that increase the range of its usefulness.

For more information circle 144 on Service Coupon Page 16 and mail now.

Steam Cleaners for Construction Equipment

A new, 4-page catalog-in-brief, describing and picturing the entire Malsbary steam cleaner line, is just off the press. It tells concisely the difference between high pressure combination HPC models, steam vapor models, and fireless steam cleaners; shows action pictures of each of the eight basic models; suggests where each model fits best; and contains an easy-to-read chart of cleaning actions, pressures, temperatures, and capacities. Copies may be obtained by writing to Malsbary Manufacturing Co., 845 92nd Ave., Oakland 3, Calif. Ask for Catalog 156.

For more information circle 145 on Service Coupon Page 16 and mail now.

Pressure-Treated Timber Highway Guard Posts

Pressure-treated timber highway guard posts are low in first cost and require no maintenance, according to a new design guide folder issued by the Western Wood-Preserving Operators' Association, 1410 S. W. Morrison St., Portland 5, Ore. The publication describes the sawn-timber, treated guard post developed through research by the Association and

WHAT ABOUT YOU, MR. READER?

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SIGNATURE

now adopted by most highway departments in the western states. Lower transportation costs, easy alignment, no painting, less settling in soft grades, high strength in relation to weight, easy installation and adaptability to any type of guard rail are among advantages presented.

For more information circle 146 on Service Coupon Page 16 and mail now.

Automatic Curbing Laying Machine

An 8-page brochure on its automatic curb laying machine is available from E. L. Hardin Associates, Inc., Salisbury, N. C. This machine uses no forms, is self-propelled and will put down either asphaltic or cement concrete curb. It is slated to travel at the rate of 7½ ft. per minute. Asphaltic or cement concrete is fed into the hopper, where it is extruded through worm gears into the curb model under high pressure. The compaction pressure causes the machine to move forward on the line marking, where a hot application or a tack coat of emulsified asphalt is first put down to receive and bond a curb on the subgrade, on the base or on the finished pavement. Three men are required in the operation of the machine and on straight runs, it is stated that up to 1800 ft. of curb have been laid in a normal working day. This machine weighs 500 lb. and has a Wisconsin BKN motor rated at 6.8 hp.

For more information circle 147 on Service Coupon Page 16 and mail now.

Advantages of Hyster "Grid Roller"

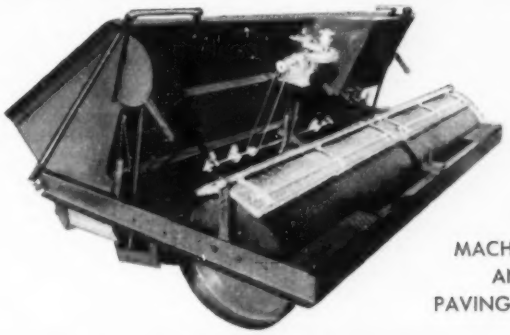
Advantages of the new advance-design Hyster "Grid Roller" for embankment compaction, crushing and compacting pit run rock for surface or base courses, and salvaging deteriorated bituminous road surfaces are explained in two new Hyster booklets (Nos. 1374 and 1470) available from Hyster Co., 2902 N.E. Clackamac St., Portland 8, Ore. Job data are used to illustrate money-saving features. One survey points out how Sutter County, California, saved $4,760 by reclaiming the material in 1½ miles of bituminous road. Another report describes use of the Hyster "Grid Roller" in crushing limestone rock to 2-in. minus. On-the-job photographs and considerable factual data supplement specifications included in the booklets.

For more information circle 148 on Service Coupon Page 16 and mail now.

Michigan Turbo-Dozer Treated in Booklet

More than 50 photographs arranged in film clip fashion illustrate the operation and correct application of the Michigan Model 180 Turbo-Dozer in a new 20-page booklet (Bulletin 157) offered by Clark Equipment Co.'s Construction Machinery Division, Pipestone Road, P. O. Box 599, Benton Harbor, Mich. A running commentary or "script" alongside the photographs describes the oper-

OVERMAN STONE AND BITUMINOUS SPREADER



THE PAVING MACHINE DESIGNED AND BUILT BY A PAVING CONTRACTOR

It is a simply constructed paver — no heavy expensive controls or machinery, no complicated operation; yet it will do the work faster and better than other pavers costing several times as much. New dual vibrator assures free-flowing delivery of material from hopper to pavement; gives faster, smoother action. Quickly attached towing hitch allows it to be moved between jobs by truck at regular driving speeds.

Your BEST BUY for price, quality and speed. Increase your profits on paving contracts. Get the facts—prove it for yourself.

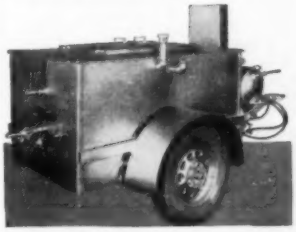
WRITE FOR BULLETIN TODAY

I. J. Overman Mfg. Co.
BOX 896 MARION, IND.

. . . for more details circle 233, page 16

White HEATING KETTLES

FOR *SAFER* MELTING OF BITUMINOUS MATERIALS



Tool Heaters
Surface Heaters
Special F-10 Compound Kettle
Torches and Burners

Capacities from 80 to 325 gallons. All equipped with *exclusive* FIRE PROOF TOP (hinged tops available for roofing use). Operator and equipment are *protected* from flash fires. Complete line of accessories optional. Choice of kerosene and propane burners.

White MANUFACTURING COMPANY
ELKHART 20, INDIANA

. . . for more details circle 249 page 16

ational features of this rubber-tired dozer powered by a turbocharged diesel engine. It explains how hydraulic controls facilitate easier maintenance, how the 2¾-yd. capacity bowl can be tilted while the machine is in motion and how the machine moves over the highways under its own power, at a speed of 27 miles per hour.

Dimensional specifications of the Model 180 are shown on side and overhead view drawings. Engine, power train and hydraulic system specifications are also listed.

For more information circle 149 on Service Coupon Page 16 and mail now.

Steel, Aluminum and Stainless Grating

An illustrated report on the use of steel, aluminum and stainless grating and stair treads has been published by the Klemp Metal Grating Corporation. The report (in brochure form) discusses the various types of electro-forged welded grating as well as offering dimensional sketches and data on riveted grating. Also discussed is bridge decking and an illustrated series on the various types of anchors suggested for grating installations. A detailed safe load table with conversion factors, panel width constant chart and data on the standard widths and types of steel stair treads most frequently used are also recorded in the pamphlet. This brochure is available at no charge by writing directly to: Dept. Sp, Klemp Metal Grating Corporation, 6601 South Melvina Ave., Chicago 38, Ill.

For more information circle 150 on Service Coupon Page 16 and mail now.

Concrete Forming Equipment

A new 8-page catalog describing its latest concrete forming equipment has been released by Symons Clamp & Manufacturing Co., 4249 West Diversey Ave., Chicago 39, Ill. It describes in detail advantages of Symons' lightweight plywood forms, magnesium forms, and wood rim forms as well as form hardware, shores, ties and column clamps.

Completely illustrated, the catalog shows on-the-site applications of equipment along with cutaway drawings and photographs of corners, pilasters, fillers, walers, curves, and bracing and scaffolding.

Also shown are such supplementary equipment as bar ties, tie chairs, washer ties and erection hardware.

For more information circle 151 on Service Coupon Page 16 and mail now.

Portable Gasoline Engine Tools

The Mall Tool Co., 7725 South Chicago Ave., Chicago 19, Ill. has published a new 63-page catalog, (No. 32) describing and illustrating its complete line of portable gasoline engine tools.

Data and full details are given on the following portable gasoline engine tools: "MG" chain saws, generators, land clearance saws, pumps, earth and wood augers, vibratory earth borers, concrete vibrators, troweling machines, concrete surfacers and attachments, saw chains, conversion sprockets and accessories. Also, information on electric and pneumatic chain saws is included in this catalog.

For more information circle 152 on Service Coupon Page 16 and mail now.

Portable and Semi-Portable Crushing Plants

A new bulletin, No. C12-B16, published by Denver Equipment Co., P.O. Box 5268, Denver 17, Colo., presents facts about Denver Type "J" portable and semi-portable crushing plant. Specifications and diagrams of the Denver Type "J" portable crushing, screening and loading plant give size, capacity and operation of this completely portable sand and gravel preparation unit.

Two other highly mobile units, the Denver Type "J" portable crushing unit and the Denver trailer crushers are also described.

For more information circle 153 on Service Coupon Page 16 and mail now.

SWENSON SPREADERS FOR ICE CONTROL

SPREADS SALT 200 LBS. PER MILE OR IN ANY DESIRED AMOUNT
Lays a Narrow Strip or Full Traffic Lane

Handles all granular materials — salt, cinders, sand, calcium chloride, rock chips. Spreads at speeds up to 30 M.P.H. Clutch-controlled flow: steady or intermittent for hills and intersections.

Write for complete information

SWENSON SPREADER & MFG. CO.
LINDENWOOD, ILLINOIS

. . . for more details circle 240, page 16

SAND
GRAVEL
STONE

DRY
IN ONLY
10 MINUTES

HOURLY OUTPUT
Sand 6-7 tons
•
Stone, Gravel 10-15 tons

Mobile, fast and economical, the TARCO "Flash-Flame" AGGREGATE and MATERIAL DRYER will keep your crew busy! Also dries Slag, Peat, Soil, Metal Shot, Vermiculite, Ores, Sewer Bed Sludge, etc. See your dealer or write for details.

TARRANT MFG. CO.
25 Jumel Pl., Saratoga Springs, N. Y.

TARRANT MANUFACTURING CO. SARATOGA SPRINGS, N.Y. TARCO EQUIPMENT

. . . for more details circle 260, page 16

With the Manufacturers and Distributors

ED GALVIN DIES. Emmet R. Galvin, Sr., since 1950 assistant to the president and general manager of the Buda Division of Allis-Chalmers Manufacturing Co., died suddenly Dec. 27, two days short of attaining his 71st birthday. Since 1925 Ed Galvin has led a very active life in the construction machinery business. He was a member of the A.R.B.A., president of the Manufacturers Division in 1943-1944. He leaves his widow, Deva Galvin; three sons, Emmet R. Galvin, Jr. of Minneapolis; Jay Galvin of Ada, Okla., and John Galvin of Flossmoor; three daughters, Mrs. Deva Swords of Downers Grove, Ill.; Mrs. Dorothy Power of Corpus Christi, Texas, and Mrs. Mario Sutorius of Homewood; and 10 grandchildren.

Emmet R. Galvin

WICKER HEADS FEDERAL TRUCK SALES: Robert L. Wicker, for the past three years, general sales manager for Dart Truck Co. has been appointed sales manager for the Federal Motor Truck Division of Naxco Industries, Inc., Minneapolis, Minn.

SWIGERT ELECTED VICE-PRESIDENT NAM: Ernest G. Swigert, president, Hyster Co., Portland, Ore., has been elected national vice-president of the National Association of Manufacturers.

NEW DISTRIBUTORS FOR MICHIGAN LINE: The following new distributors have been appointed to handle the Michigan line of tractor shovels and excavator cranes of Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich.; J. W. Burress, 100 Waughtown St., Winston-Salem, N.C., for entire state of North Carolina; Sheehan-Bartling, Inc., West 12th St., Sioux Falls, S. D., for entire state of South Dakota.

MEYER APPOINTED DISTRICT SALES MANAGER: Harold Meyer has been appointed district sales manager for Universal Atlas Cement Co. and will head new sales office in the Bankers Building, 208 E. Wisconsin Ave., Milwaukee, Wis.

NEW DETROIT DIESEL DISTRIBUTOR: Gil Boers Equipment Co., 7739 S. Kedzie St., Chicago, Ill. has been appointed distributor for General Motors diesel engines. The company will handle sales and service for both industrial and marine Detroit diesels in Northern Illinois and the counties of Lake, Porter, La Porte and St. Joseph in the state of Indiana.

HOUGH NAMES NEW DISTRIBUTORS: The Frank G. Hough Co., Libertyville, Ill. has announced the appointment of new distributors and the assignment of additional territory to some of their present distributors as follows: Phillippi Equipment Co. for the state of Minnesota, with headquarters in Minneapolis and branches in Duluth, Hibbing and Moorehead, Minn. Rish Equipment Co. now serves the entire state of Ohio, with plants in Cleveland, Columbus, Dayton, Toledo, Cincinnati and Portsmouth. J. D. Evans Equipment Co. has the entire state of South Dakota. Their headquarters is in Sioux Falls, with a branch in Rapid City. Brandeis Machinery & Supply Corp. has added territory in Southern Illinois, which they are serving from their new plant in Mt. Vernon, Ill. State Equipment Co. has been granted the state of Vermont territory which they are serving out of Montpelier. Orton Equipment Co. is the new Hough distributor at Stratford, Calif.

LE ROI NAMES NEW SERVICE DEPT. MANAGER: Paul Azzolinos, formerly assistant service department manager, has been appointed manager of the service department of Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis.

GOOD ROADS NAMES REGIONAL REPRESENTATIVE: W. F. Jahn has been appointed regional representative in the Midwestern states by Good Roads Machinery Corp., Minerva, Ohio. Mr. Jahn, who will be located at 476 Arlington Ave., Elgin, Ill., was formerly with Gar Wood Industries and the Elgin Sweeper Corp. He will serve an area including Wisconsin, Minnesota, Michigan, Illinois, Iowa, Missouri and Indiana.

WYLIE MANUFACTURING CO. MOVES: Wylie Manufacturing Co., Inc., has moved into its new offices and plant at 640 N. Meridian St., Oklahoma City, Okla.

NEW GENERAL SALES MANAGER FOR JAEGER: Effective Jan. 1, J. D. (Don) Anderson became general sales manager of the Jaeger Machine Co., Columbus, Ohio, succeeding J. H. Yearling who assumed the new position of director of market promotion. Yearling has been associated with Jaeger for 28 years, serving as sales manager since 1949. Anderson has been 21 years with the company and was a divisional sales manager prior to becoming general sales manager.

NEW HYSTER DEALER IN PENNSYLVANIA: Modern Handling Equipment Co. has succeeded Rapistan of Pennsyl-

Manufacturers items continued on page 154

"THIS LUBRICANT KEPT 'EM ROLLING IN MUD, MUCK AND WATER"

—says J. O. ARCHIBALD
of Redwood City, California

The job was clearing 500 acres of salt marsh for crystallizing ponds. To quote, "We selected LUBRIPLATE No. 107 for track and general lubrication and LUBRIPLATE APG-140 for transmissions and final drives. During the entire job there was no replacements of track rollers nor any tie-ups of equipment due to parts replacement or breakage!"

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

LUBRIPLATE LUBRICATION

MAKES CARS AND TRUCKS RUN BETTER AND LAST LONGER

LUBRIPLATE H.D.S. MOTOR OIL . . . THE OIL THAT NEEDS NO ADDITIVES

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

. . . for more details circle 229, page 16

Contractor's check list *for specifying* ASPHALT

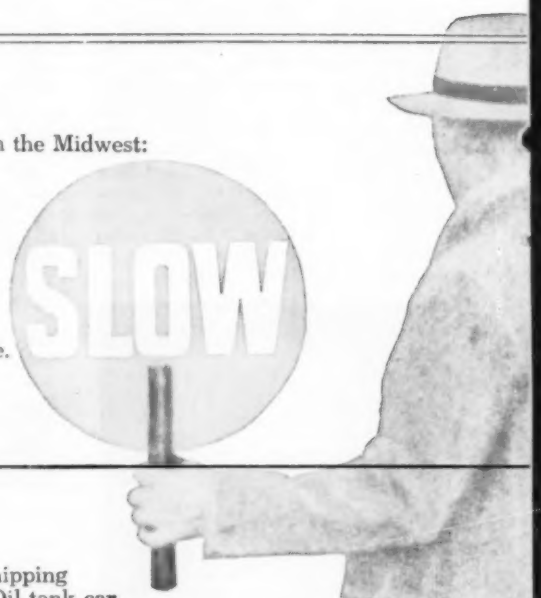
1

CONVENIENT SHIPPING SOURCES

Standard has 5 centrally located shipping points in the Midwest:

Wood River, Ill.
Whiting, Ind.
Casper, Wyo.
Neodesha, Kans.
Sugar Creek, Mo.

Asphalt from Standard Oil gets shipped to you direct from the shipping point nearest your job site. Shipments get to the site faster, keep you on schedule.



2

TANK CAR AND TANK TRUCK SHIPMENTS

Shipments can be made from any Standard Oil shipping point in either tank car or tank truck. Standard Oil tank car service keeps contractors supplied with asphalt at the rail head as needed. Tank truck deliveries permit shipment directly to the job site, often saving heat-up to unload, and making possible unloading directly at the batching plant.

3

RELIABLE SOURCE OF SUPPLY

A reliable source of supply means three things to a contractor:

1 A supplier that delivers according to contract *when needed.* Standard Oil recognizes this as a prime factor in contracting for asphalt, delivering as the contractor needs material.

2 A supplier familiar with the contractor's problems. Standard has been supplying asphalt to contractors in the Midwest for many years. Standard salesmen know contractor's problems . . . know how to give him service.

3 A contractor must have dependable sources of supply. Taking care of its customers through periods of short supply as well as delivering when materials are plentiful is the kind of service contractors need, want and get from Standard. With the big program of road construction now under way and promises of even bigger programs to come, an assured, dependable source of asphalt is a must for every road building contractor.

Check this list, then check with Standard. In the Midwest contact your nearby Standard Oil office. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY (Indiana)

. . . for more details circle 239, page 16

BOILERS

One — Cyclotherm Boiler made by Ames Iron Works of Oswego, N. Y., S/N 6012, Type No. 17500B-A343, steam pounds per hour 17,250, maximum working pressure 125 lbs., heating surface 1532, plates 3/8" thick, head 5/8" thick, National Board No. 3137, year 1951.

Two — 80 HP low pressure boilers, 15 pound boilers, Catalogue No. A-80, made by Ames Iron Works, Oswego, N. Y., Type seams welded, shell thickness 5/16", head 7/16", square foot heating 333, year 1951, S/N 57026. These are coded boilers.

OVERHEAD CRANES

Seven — Overhead cranes, three are double beam, four are single beam, 5, 6 and 8 ton capacity, 40' span. The double beam cranes are air operated, 22' of structural steel for these cranes (7/12, 50 lb. I Beam), fabricated 10" channel attached with track & 48" lengths.

HEATING UNITS

60 Trane Steam heated units (8 are 120 TL, 14 are 150TL, and the balance are 220 TL).
50 Radiant heating units, 3 to 16 feet long.
10 Airthurm heating units, S/N 868.
4 — 968 Trane Heaters.

OTHER EQUIPMENT

Assortment of Valves 1300, 1/2" to 8". 85% are date valves.
180 Wood Trusses, 40' span.
100 Colen supports for trusses.
2500 Squares of Corrugated Transit Siding.
400 Squares of Corrugated Metal Siding, 20 ga.
Many other items too numerous to mention.

For Complete Information Call or Write

E. M. Fuller

Route 4, Paducah, Ky., Phone 310408

3500 MANITOWOC ERECTION CRANE

Diesel — 120' boom, 30' jib
This machine just like new.

FRANK SWABB EQUIPMENT Co., Inc.

313 Hazleton Nat'l Bank Bldg.
Hazleton, Pa. — GLadstone 5-3658

HYDRAULIC TIRE SPREADER
FULLY GUARANTEED
brand new Government Surplus
Spreads Truck Tires Thru 12:00

Compact and foolproof, this foot-operated tire spreader handles heavy duty truck and bus tires with ease — all sizes from 4½" to 12". Hydraulic mechanism exerts pressure as needed up to 4,000 pounds. Completely, easily operated with one foot for all repairs and inspections. Balloon tires can be inverted. Welded construction. May be floor-mounted or not.

Regular $31.95

$19.50 ea.

4 or more 17.50 ea., f.o.b. Akron, Ohio

AKRO-MILS., INC.

Box 989 R.S. Akron 9, Ohio

WANTED

Bucket, Dragline 2½-3 Yd.
Grader, Model 112 or Equal.
Roller, Tandem 5-8 Ton.

ANDERSON EQUIPMENT CO.
Box 1737, Pittsburgh 30, Penna.
Phone: LEhigh 1-6020

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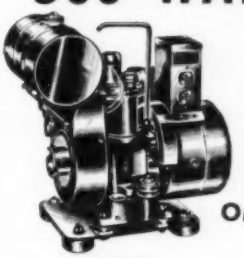
500 WATT POWER PLANT



NEW Government Release!

Gov. Cost $300.00

For Daily and Stand-by Service on all Road and Construction Jobs . . . a BUY!

ONLY $79.50 Pre-paid

One Emergency Use and It's Paid For!

FULLY GUARANTEED!

- **BRIGGS & STRATTON GAS ENGINE**
- **COMPOUND-WOUND GENERATOR**

PORTABLE!! LIKE NEW!! Worth its weight in gold in event of power line interruptions — and for many daily farm, home and construction jobs. Priced at less than cost of gas engine alone! OPERATES: Light bulbs up to 500 watts; incubator and brooder heat lamps (keeps chicks alive in power failures); ½" electric drills; 6" blade power hand saws (where lines are expensive to run in); food mixers; vacuum cleaners; floor polishers; AC-DC radios; electric hedge trimmers; shallow well pumps; many more machines.

Compound wound generator has max. output of 500 watts, 115 volts DC (although rated by army at 250 Watts for severe climatic conditions). Powered by Briggs & Stratton 1½ HP, 4-cycle 2700 RPM, easy-to-start engine that operates 3 HOURS ON 1½ GAL. OF GAS. Automatic governor maintains full voltage regardless of load. Standard duplex outlet receptacle with built-in filter and condenser eliminates static in radio reception. Cushion mounted for vibrationless operation. Instruction manual included.

CARRYING CASE with Handles and "latch-on" locks included free!

WE PAY SHIPPING

Supply Limited! Immediate Delivery! Order from AD

ROBERTS ELECTRIC COMPANY Dept. RS-390

849 W. Grand Ave., Chicago 22, Illinois

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COPY AND CLOSING DATES Final closing date is the Fifteenth of the preceding month. Magazine is issued 1st of publication month. If proof is desired, copy must be received 5 days preceding closing date.

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MILLION $ DOLLAR $ INVENTORY

★ **Ten Acres full of Government Surplus**

• TRUCKS • HALF-TRACKS • TRACTORS

• TRAILERS • AMPHIBIANS • JEEPS

All equipment never commercially sold or used. Purchased direct from U. S. Ordnance. We have made terrific buys and are ready to pass them on to you. It will pay you to act now.

20—6x6 GMC Trucks equipped with 12′ Dump bodies and front end winches
2—GMC Amphibian 6x6 Trucks
40—Studebaker Amphibian Weasels
20—4x4 Dodge Carry-All
25—7½ ton International Cab & Tractors. Extra long wheel base with Tandem rear ends.
Fruehauf 25 Ton Low Bed Trailer.
2—Special 50 Ton Trailers.
Flat Trailers, Cargo Trailers, ¼ to 15 Ton.
2—6x6 Diamond T with booms and Revolving Crane.
10—4x4 Scout Cars
500—6x6 Armored Cars.
Half Tracks with & without Winches.
Spare Parts for GMC's 6x6 and International 6x6's chassis equipped for Bantam Shields. Up to 75% off.

Heavy Duty WINCHES DUMP BODIES—Trailer Axles—Engines of all sizes and a complete line of Truck Parts for Military and Civilian Trucks and Jeeps.

To expedite delivery and lower shipping costs, Spare Parts may be ordered from United Auto Parts Co. Inc., 1901 Troost Ave., Kansas City, Mo.

★ ***Wire — phone or write your requirements.***

Ready for immediate shipment — all items subject to prior sale.

TEXARKANA TRUCK PARTS CO. INC.

Ph. 328832 — JOHN FUZY, MGR.

Dallas Highway 67 • West 7th Street

P. O. Box 771 **Texarkana, Texas**

For Sale

EUCLID REAR DUMP TRUCKS

Model 9W BUCYRUS-ERIE Dragline, 8 yd.
Model 1055 P & H Shovel & drag, 3½ yd.
Model 1600 P & H Shovel, 6 yd.
Model 54B BUCYRUS-ERIE Shovel, 2½ yd.
Model 54B BUCYRUS-ERIE Dragline, 2½ yd.
Model 38B BUYRUS-ERIE Shovel, 1½ yd.
Model 120B BUCYRUS-ERIE Shovel & Drag, 5 yd.
Model 170 B BUCYRUS-ERIE Shovel, 6 yd.
Model 200B BUCYRUS-ERIE Dragline, 5 yd.
Model 5-W BUCYRUS-ERIE Dragline, 6 yd.
Model 4500 MANITOWOC Dragline, 5 yd. & 5 yd. shovel.
Model 4161 MARION Shovel & drag, 5 yd.
Model 7400 MARION dragline, 9 yd.
Model 80-D NORTHWEST shovel, 2½ yd.
Model 6 NORTHWEST shovel, 1½ yd.
Model 1201 LIMA dragline, 3½ yd.
Model 3500 MANITOWOC dragline, 2½ yd.
5 yd. Dragline, excellent condition, $33,000.00.
CATERPILLAR GRADERS
ROGERS Lowbed trailer.

WILLIAM LUBRECHT, III

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4—2-Yard dumpcrete concrete bodies with hydraulic pumps, hoists and chutes.
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NEW 1952 **NEVER USED**

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Power Units - Model 12104 - Serial Nos. 12A-1961, 12A-1962, 12A-1930.

Radiator Cooled — Heavy Duty Intake Air Cleaners — Heavy Duty Drive — 1-77 to 1 Power Transfer Reduction Gear — "60" Injectors — 24-Volt Starting Motor — Instrument Panel — Standard Equipment — 24" 10 Groove V-Belt Sheave — Disconnect Clutches — Exhaust Snubbers — Adjustable Slide Rails —

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Model D8 Bulldozer and 10B Crane and Backhoe

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1—Huber Maintainer complete with front mtd. power broom.
(Located at Lawrence, Ind.)

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Winches, originally used on telephone trucks.
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Each of these machines has been reconditioned, is in first class condition, and ready for work. May be inspected at our warehouse on Kelley Avenue.

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20 Hoisting Engines, single, double & 3-drum. Gas, Elec. & Dsl. Dr.

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Large Stock of Shackles, Hooks, Turnbuckles, Wire Rope ¾″ to 3″ diam., single-double-triple sheave blocks, etc.

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25 ton Whitcomb Diesel Locomotive 1949.
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Rebuilt — A-1 Condition
48B Bucyrus-Erie Shovel 2 cy Diesel
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1 Ford rubber-tired wheel tractor with Dearborn hydraulic loader with two buckets.

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1 Used Universal 42″x8′ single deck screen.

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All in good condition and reasonably priced.

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Excellent For Power Plant

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Fits all '41-48 Cars and Trucks

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Six and Four Wheel Drive Units Ranging from 1½ to 20 Ton Capacities, Gasoline or Diesel Engines.

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Above equipment located in South Carolina

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1—100-ton, 3 compartment, all steel aggregate bin and 3-cubic yard material batcher with 3 6000-lb. weigh beams complete. 1 3½-yard Challenge truck mixer with industrial engine complete. 1 3½-yard CMC truck mixer with industrial engine complete. Would like to sell as complete unit.

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Write for prices and sizes not listed. Send check or money order or 25%, balance C.O.D. Freight Collect.

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All types of heavy work tires. Excellent condition.

750-20 8-ply Army Surplus Full Tread

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Terrific Value
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4500 Manitowoc Shovel-Dragline Combination, 1951 Model with Cat Engine.
Bucyrus-Erie 54B Hy Front Shovel-Drag Comb.
2 D-8 Cable Bulldozers.
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McCarthy Hy-Wall Drill mounted on Chevrolet Truck.
Lima 802 Shovel-Dragline Combination with GM Diesel Engine & swamp pads.
Cat 12 Grader.

This equipment can be seen working in Southern Tennessee.
All in excellent condition, available immediately.

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All types of mining machinery, and all types of vibrator screens including the following:

2—5′x12′ Tyler 600 single deck
1—5′x12′ Tyler 600 double deck
3—5′x14′ Tyler 600 double deck
2—4′x10′ Selectro, either single or double deck
1—3′x8′ Deister double deck

If interested in any of the above, or any other type of vibrator or mining machine,

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1—Shovel front for P & H Model 855-A.
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2—Shovel fronts for Bay City Model 65.
2—Shovel fronts for Lorain Model 41.
32,000 Sq. Ft. Atlas Speed Concrete Forms.
1—McKiernan-Terry 8-S steam hammer.
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2 sets 100-F steel pile driving leads.

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vania, Inc., as Hyster dealer in eastern Pennsylvania. Offices will remain at the former location, 4200 Sansom St., Philadelphia, Pa.

LE ROI APPOINTS CONSTRUCTION SALES MANAGER: William F. Briney has been named manager of construction industry sales for Le Roi Division of Westinghouse Air Brake Co., Milwaukee, Wis. Mr. Briney has been a sales engineer and a district representative for Le Roi. He recently was sales manager for a large West Coast heavy construction machinery distributor.

EXECUTIVE APPOINTMENTS FOR WOOLDRIDGE: Three top level appointments in connection with an extensive expansion program of Wooldridge Manufacturing Division have been announced by Continental Copper & Steel Industries, Inc. Henry Gusman, CCS vice-president, who has headed the Wooldridge organization in Sunnyvale, Calif., since its founding in 1937, has moved to New York as a member of the CCS management committee. J. D. Gusman, formerly assistant to the general manager of Wooldridge Division, has been appointed as general manager of Wooldridge and assistant vice-president of CCS. E. E. Esgate, formerly a vice-president of Thew Shovel Co., is now general sales manager for Wooldridge. He also has been widely known for a number of years as a consultant to the construction equipment industry.

COUCH MADE STATIONARY COMPRESSOR SALES MGR.: Le Roi Division of Westinghouse Air Brake Co., Milwaukee, Wis., has appointed Edward R. Couch manager of stationary compressor sales. Prior to joining Le Roi in 1954 as an assistant product sales manager, Couch was with the Industrial Products Division of Westinghouse Air Brake Co., which at that time manufactured the stationary compressors now made by Le Roi.

HYSTER DEALER CHANGES NAME: Hyster Company of Louisiana, Inc., has changed their name to Hyster Sales and Service, Inc. Service and sales headquarters remain at 327 N. Diamond St., New Orleans, La. Hyster Sales and Service, Inc., represents Hyster in the entire states of Louisiana, Mississippi, Arkansas, 11 counties in southern Missouri and 26 counties in western Tennessee.

SEAMAN-ANDWALL ACQUIRE CENTURY SPREADERS: Seaman-Andwall Corporation, Milwaukee, Wis. has purchased the Century line of cement and material spreaders designed and originally manufactured by Century Engineering Co., Waukesha, Wis. The new spreaders will be manufactured by Seaman-Andwall Corporation and sold with its allied machinery which includes Pulvi-Mixers, steel wheel and pneumatic rollers.

ATHEY LICENSES AUSTRALIAN CO.: Athey Products Corporation, Chicago, Ill., has licensed Steelwald Pty. Ltd., Victoria, Australia, to manufacture Athey products in Australia to Athey specifications. This is the third manufacturer licensed by Athey. The other two are the Birtley Co. Ltd., (England) and Wright, Boag & Head, Wrightson (Pty.) Ltd., South Africa.

NEW LIMA DISTRICT MANAGER: Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio, has appointed J. V. Gunter district sales manager for Lima shovels, cranes and draglines in the Southern district.

MCCONNELL APPOINTED DISTRICT MANAGER: William P. McConnell has been appointed Pacific northwest district manager for Smith Engineering Works, Milwaukee, Wis. His territory includes Oregon, Washington and Idaho and British Columbia and Alberta in Canada. His headquarters are at 1631 N.W. Thurwin St., Portland, Ore.

NEW DISTRIBUTOR FOR DETROIT DIESEL: Hubbs Engine Co., Cambridge, Mass., has been appointed distributor for General Motors marine and industrial diesel engines. The Hubbs Co. succeeds Detroit Diesel's former marine engine distributor, the Walter H. Moreton Corporation, and will occupy the same facilities at 9 Commercial Ave., Cambridge. The new company will handle Detroit Diesel marine engines in Massachusetts, Rhode Island, Maine, New Hampshire and part of Connecticut and industrial engines in Massachusetts, Rhode Island and part of New Hampshire.

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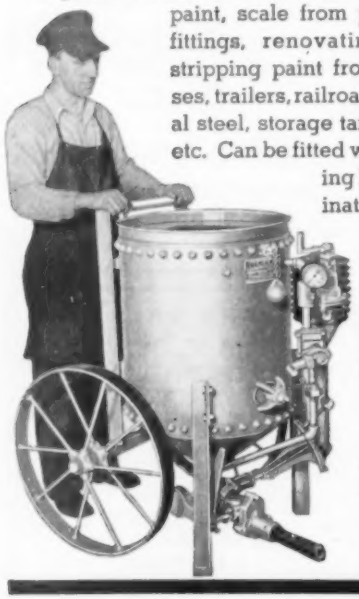

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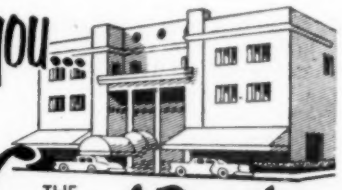

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KUNTZ APPOINTED ASST. MANAGER TRUCK SALES: Duane F. Kuntz has been appointed an assistant manager of motor truck sales for Motor Truck Division of International Harvester Co., Chicago, Ill. Kuntz previously was manager of the company's southwest motor truck sales region, and has been located in the company's general office in Chicago as a regional manager since 1950.

KEIDEL APPOINTED EUCLID AD MANAGER: R. E. Keidel has been appointed manager of the advertising and sales promotion department of Euclid Division of General Motors Corporation, Cleveland, Ohio. Mr. Keidel, with Euclid for 8 years, has handled publication advertising and all other promotion activities since 1953.

NEW DEALERS FOR HENSLEY: Hensley Equipment Co., Inc., San Leandro, Calif. has appointed the following exclusive dealers: Contractors Equip. & Supply Co., Fresno, Calif.; Columbia Equipment Ltd., Vancouver, B.C., Canada; R. A. Young & Son, Tulsa, Okla.; W. L. Johnson Machy. Co., Midland, Texas; Doug-Lynn Mfg. & Machy. Co., Santa Rosa, Calif.; Wenzel Machy. Rental & Sales, Kansas City, Kan.; Complete Industrial Supply Co., Phoenix, Ariz.

HUBER-WARCO NAMES WESTERN SALES REP.: Huber-Warco Co., Marion, Ohio, has appointed John "Jack" McCaffrey, Pleasanthill, Calif., district sales representative for 7 western states, 2 Canadian provinces and Alaska.

ST. CLAIR PROMOTED BY HYSTER CO.: Walter A. St. Clair, formerly district manager for Mid-Central District, has been promoted to assistant sales manager of Eastern industrial truck division of Hyster Co., Portland, Ore. His headquarters will be at the Danville, Ill. factory.

SEAMAN JOINS SEAMAN-GUNNISON CORPORATION: Donald J. Seaman, Jr., formerly chief engineer of Seaman Motors, Inc., Milwaukee, Wis., has joined the newly organized Seaman-Gunnison Corporation, Baraboo, Wis., according to an announcement by Ivor E. Gunnison, founder and sole owner of the predecessor Gunnison Mfg. Co. In his new connection, Mr. Seaman will carry the responsibilities of engineering and new equipment development. The Seaman-Gunnison Corporation, as successors to Gunnison Mfg. Co., will continue to build asphalt distributors, street flushers and high-pressure pumping units, according to Mr. Gunnison, who will serve as president and general manager of the newly organized company. Present plans contemplate the development and manufacture of new road builders' equipment, as well as promoting the long established Gunnison line of asphalt distributors and street flushers.

WALTER H. WILLIAMS RETIRES: Walter H. Williams, president of Drake-Williams-Mount Co., Omaha, Nebr., has announced his retirement for health reasons. He has been with the company for 50 years, and was instrumental in the development of the "Omaha Bucket." Arthur W. Williams has been named president and L. D. McMahon vice-president. Arthur W. Williams has been with the company for 30 years and moves to the head of the organization from his present position as vice-president.

B-L-H DISSOLVES FOUR SUBSIDIARIES: Baldwin-Lima-Hamilton Corporation has dissolved four wholly-owned subsidiaries, heretofore operating as independent companies and has integrated them more closely into the nation-wide organization as divisional units. The companies are: Austin-Western Co., Aurora, Ill.; Hydropress, Inc., New York City; Pelton Water Wheel Co., San Francisco; and the O. S. Peters Co., Washington, D.C. The Austin-Western Co. henceforth will be known as the B-L-H Austin-Western Works. Charles M. Lippincott, former controller, succeeds Ralph K. Stiles as head of this operation, with the title of general manager. He has also been named a B-L-H vice-president. Mr. Stiles, president of the former Austin-Western Co., retired on Dec. 31, after 23 years with the company.

MILLER NEW ASST. CHIEF ENGINEER AMERICAN TRACTOR CORP.: Kay Miller, formerly chief research and development engineer of Borg Warner Corp., has been appointed assistant chief engineer of American Tractor Corp., Churubusco (Ft. Wayne), Ind.

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Gallup, New Mexico — Hotel EL RANCHO & Bungalows
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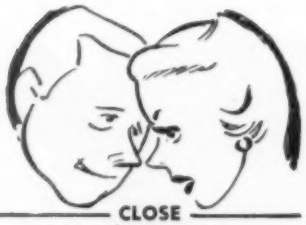

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EXECUTIVE APPOINTMENTS BY MIXERMOBILE: Three executive appointments have been announced by Mixermobile Manufacturers, Portland, Ore., in a program of company re-organization. V. C. "Boots" Dirksen has been placed in the position of sales manager, Glen Ede has been named sales promotion manager, and Joe M. Larson is the new controller.

OCHS APPOINTED GENERAL MANAGER: Robert C. Ochs has been appointed general manager of the axle division of Eaton Manufacturing Co., Cleveland, Ohio. Mr. Ochs for the past year has been assistant general manager of this division, serving under Geo. W. Veale, vice-president and general manager. Mr. Veale will continue as a vice-president of Eaton Manufacturing, devoting his time to the broader scope of corporate policy, in addition to advising R. C. Ochs in the area of axle affairs. He has been associated with Eaton and a predecessor for 35 years.

NEW GALION ALLSTEEL DISTRIBUTOR: Maday Body Works, 38 A St., Buffalo, N.Y., has ben appointed distributor for western New York for Galion Allsteel Body Co., Galion, Ohio.

YUBA ACQUIRES C & D MFG. CO.: Yuba Manufacturing Co., San Francisco, Calif. has acquired the C & D Manufacturing Co., Perkins, Calif. It will be operated as a Yuba Division with R. P. Nichols, formerly C & D sales manager in charge of sales. He will report to P. C. Cramer, sales manager, Yuba Products division.

CHANGES IN HERCULES EXPLOSIVE SALES DEPT.: Four changes in its explosive sales organization have been announced by C. W. Ballard, director of sales of the explosives department of Hercules Powder Co. Philip R. Hammond, acting manager of the Pittsburgh, Pa. office, has been appointed assistant sales manager, and transferred to the Wilmington office. William T. Marsh, sales manager of Nitrogen Products, at Louisiana, Mo., has been appointed assistant manager of the Contractors' Division in Wilmington. Thomas E. Brown, manager of the Hazelton, Pa. sales office, has been appointed manager of the Pittsburgh, Pa. office. John H. Wilson, assistant manager of the Hazelton office, has been appointed manager of that office.

GLEDHILL BUYS DAVENPORT BESSLER SNOW PLOW BUSINESS: Gledhill Road Machinery Co., Galion, Ohio, has purchased the snow plow business of Davenport Bessler, Davenport, Iowa. Davenport Bessler has been continuously engaged in the manufacturing and sales of snow plows in Western United States, Canada and Alaska since 1930. They have specialized in the very heavy duty "V" plows with wings but have had a complete line that is well known and respected. The Gledhill Road Machinery Co. started the manufacturing of snow plows in 1935 and have pioneered in the "speed" type snow plow which has come into increased use by highway departments and city plows with safety trip. Floyd Evans, who has served Gledhill

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for several years in many capacities, has been appointed sales manager.

WYLIE MANUFACTURING CO., INC., of Oklahoma City has changed addresses for office and plant to 640 North Meridian Street, Oklahoma City (old address 5926 N. W. 39th Street). Company will retain its P.O. Box 7086 as before.

D. W. LEHTI, President of Link-Belt Speeder Corporation, Cedar Rapids, Iowa, has been elected President of the Power Crane and Shovel Association. Other Association Officers include M. B. Garber (The Thew Shovel) Vice President; P. H. Birckhead (Bucyrus-Erie) Director; C. B. Smythe, (Thew) Director.

Continuing as Directors are D. H. Ross (Clark Equipment), Fred Salditt (Harnischfeger), F. W. Zimmer (Manitowoc), J. P. Courtright (Marion Shovel). Herbert S. Blake, Jr. is the Association Executive Secretary, with address 75 West Street, New York 6, N.Y.

30 "no-accident" contractors

Thirty contractor members of Associated General Contractors of Missouri reported "no accidents" during the 12 months of their work ending September 30, 1955.

This is the highlight of the annual accident prevention summary of AGC of Missouri, which also noted that the frequency of accidents on the average among the state's contractors has been dropping steadily and the number of no-accident firms rising each year.

Fallen tree branch on the highway

By Albert Woodruff Gray

A tree at the side of a New York State highway was infected with dutch elm disease and tagged for removal by state inspectors. An automobile driver a week later, traveling at 25 miles an hour, saw a limb of the tree lying across the highway, turned sharply to the left and collided with another car.

The New York Court awarded him a judgment of $15,000 against the state for the injury. "Such condition had existed for a period of time sufficient for the State of New York in the exercise of reasonable care to have acted to remedy it," said the court. "The failure on the part of the state to do so was negligence on its part, which we hold was the sole proximate cause of the accident with these resultant damages.

"The State of New York is obligated to maintain its highway in a reasonably safe condition for travel, not only with regard to obstructions and defects in the travelled portion of the road but also with regard to conditions adjacent to and above the highway, which might reasonably be anticipated to result in injury and damage to the users."

Gardner v. State, 133 N.Y.S.2d 852, New York, May 27, 1954.

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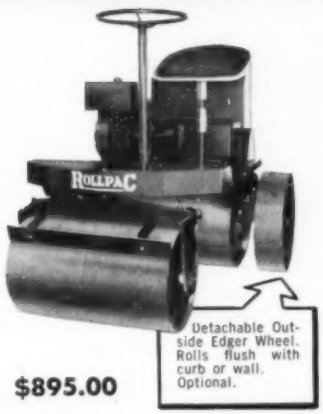

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INDEX TO ADVERTISERS

Acme Truck Parts and Sales 152
Air Compressor Rental Company 148
Akro-Mils, Inc. 143
Allis-Chalmers, Construction Machinery Division ..... 40 & 41, 96
Anderson Equipment Company 143 & 144
*Armco Drainage & Metal Products, Inc. 115
Arrow Manufacturing Company 155
*Austin-Western Works, Construction Equipment Division 79

Ballenger Paving Company ..... 151 & 153
*Barber-Greene 122
Baron Tire Company 153
Beemsterboer, Sam 149
Bethlehem Steel Company 3
*Blaw-Knox Company, Construction Equipment Division 124
Boyle, C. Morris 145
Brace Equipment Company 150
Bucyrus-Erie 46
Butler Machinery Company 146

Caterpillar Tractor Company ..... 7, 56, 64 & 65, 121, Third Cover
Cemco Manufacturing and Supply Co. 149
Chain Belt Company 14
Chancellor Hotel 155
Chapin Cylinder Head Company 153
*Chrysler Corporation, Dodge Truck Division 73
*Chrysler Corporation, Industrial Engine Division ..... Second Cover
*Cleveland Trencher Company, The 70
Clipper Manufacturing Co. 93
*Colorado Fuel & Iron Corporation ..... 37 & 38
Columbia-Southern Chemical Corporation 48
Consolidated Diamond Tool Corp. 101
Construction & Power Machinery, Inc. 152
Contractors Machinery Company 146
Coral Reef Hotel, The 154

Deeds Equipment Company 151
Detroit, City of 152
*Detroit Diesel Engine Division — General Motors Corporation ..... 30 & 31
Dietz Company, R. E. 102
Dixon Valve & Coupling Co. 100
*Dodge Truck Division, Chrysler Corporation 73
Dotmar Industries, Inc. 106

Eagle Crusher Co., Inc. 100
Earle Equipment Co., The 147
Eaton Manufacturing Company 27
Eighmy Equipment Company 147
Etnyre & Company, E. D. 120
Euclid-Arkansas, Inc. 145
Euclid Division — General Motors Corporation ..... 28 & 29

Fehrs Tractor & Equipment Company 150
Firestone Tire & Rubber Company, The 36
Al Fishel 147
Ford Motor Company, Industrial Engine Department 89
Ford Motor Company, Truck Division ..... 42 & 43
Frazier, George 147
Freeport Const. Co. 149
French, James C. ..... 144 & 145
Fuller, E. M. 143

Gahagan Dredging Corporation 113
Galion Allsteel Body Company ..... Fourth Cover
*Galion Iron Works & Mfg. Co., The 47
Gargaro Construction Co. 146
Garrison Spillway Constructors 149
Garson, Jack 148, 151
*Gar Wood ..... 90 & 91
Gavenda Brothers, Inc. 153
Goodman & Sons Company, Al J. ..... 146 & 151
Goodyear, Truck Tire Department 5
Gorman Rupp Company, The 107
Grand Prairie Farms 145
Gruendler Crusher & Pulverizer Co. 144
Gulf Oil Corporation 39

*Harnischfeger Corporation, Power Crane and Shovel Division ..... 74 & 75
Hercules Motors Corporation 21
Hetherington & Berner Inc. 136
Homelite, A Division of Textron American, Inc. 116, 117
Hotel Hollenden 156
Hotel Kansas Citian 154
Hotel Raleigh 156
Hotel Southmoor 157
*Hough Company, Frank G., The 17
*Huber-Warco Company 18

International Harvester Company — Drott Division ..... 12 & 13
International Harvester Company — Industrial Power Division ..... 34 & 35
International Harvester Company — Motor Truck Division 10
Iowa Manufacturing Company 11

Jackson Tractor Parts Company, Inc. 149
*Jackson Vibrators, Inc. 137
Jaeger Machine Company, The ..... 44 & 45
Johnson Company, C. S. ..... 24 & 25
Jones Equipment Company, L. H. 147

Keesler, C. C. & F. F. 151
Kennedy and Company 145
Killion Motor Supply 148
Koehring Company ..... 24 & 25
Kwick-Mix Company ..... 24 & 25

*Le Roi Division of Westinghouse Air Brake Co. 52
LeTourneau-Westinghouse Company 49, 51, 53, 55
*Littleford Bros., Inc. ..... 132 & 133
Little Rock Road Machinery Company 153
Lubrecht, III, William ..... 144 & 151
Lubriplate Division, Fiske Brothers Refining Co. 141
Lueking, Ed 147
Lufkin Rule Co., The 110

Madsen Works, Construction Equipment Division 125
Mall Tool Company 83
Marion Power Shovel Company 103
Marks Tractor Company 150
Maxon Construction Company, Inc. 111
McConnaughay, K. E. 126
*McKiernan-Terry Corporation 114
Memphis Equipment Company 157
Memphis Truck Equipment Company 145
Metalweld, Inc. 150
*Mid-Western Industries, Inc. 69
Mississippi Valley Equipment Company ..... 147 & 152
Morris Bros. 151

*Naugatuck Chemical Division, United States Rubber 123
Nelson & Son, M. N. 153

O'Brien Machinery Company, The 150
O'Conner Used Truck Sales, F. M. 153
Orange Quarry Company 149
Overman Mfg. Co., I. J. 139
Owatonna Tool Company 113

Parsons Company ..... 24 & 25
Pfotzer, E. & E. J. 153
Plains Machinery Company 152
Portland Cement Association 32
Presstite Engineering Company 6
Priester Machinery Company, Inc. 148

Reichenbach, Ben E. 149
Riemer Bros., Inc. 151
Roberts Electric Company 143
Rocket Sales Company 148
Rolcor Industries 157
Rosco 135
Royal Crest Hotels 157
Ruemelin Mfg. Co. 154
Ruffridge-Johnson Equipment Company, Inc. 152
Ryan Company, The George T. 149

Sanctis Construction, Inc. 144
*Seaman-Andwall Corporation ..... 104 & 105
Seaman-Gunnison Corporation 26
Sioux Road, Inc. 149
Slaughenhaup, H. B. 145
Sloan Construction Co., Inc. 151
Sonoco Products Company, Construction Products Division 109
Southern Tire Company 112
Standard Oil Company (Indiana) 142
State Electricity Commission of Victoria 146
Swabb Equipment Company, Frank ..... 143 & 148
Swenson Spreader & Mfg. Co. 140
Syntron Company 118

Tallman, Frank Benson 150
Tarrant Mfg. Co. 140
Tennenbaum & Co., Merle S. 144
Testa Brothers, Inc. 153
Testing Service Corporation 145
Texarkana Truck Parts Company, Inc. 144
Texas Company, The ..... 8 & 9
Thew Shovel Company, The 15
Timken Detroit Axle Division — Rockwell Spring and Axle Company ..... 22 & 23
*Timken Roller Bearing Company, The — Rock Bit Division Front Cover
Tractor & Equipment Company 145
Troyer, Stanley B. 151

Ubbink Fuel & Dock Co., The 149
Unit Crane & Shovel Corporation 50
*United States Rubber — Naugatuck Chemical Division 123
United Southern Contractors, Inc. 151
Universal Engineering Corporation 54

Vandeventer Auto Sales 152
Vickers Incorporated 92

Warn Manufacturing Company 108
Watkins-Aldridge Equipment Co., Inc. 153
Wenzel Machinery Rental & Sales Company 150
Weinberg, Max L. 148
West Virginia Pulp and Paper Company 4
White Company, David 156
White Manufacturing Company 139
Williams Construction Company 152
Willys Motors, Inc. 33

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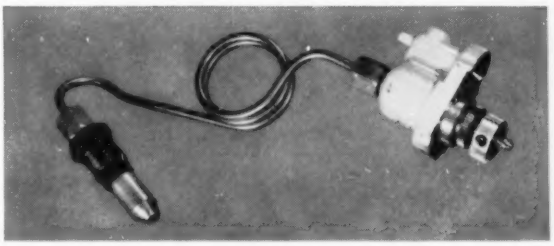
If the trouble's with substitute fuel injection parts, you should know this:

Original Caterpillar fuel pumps and injection valves are made from very special steel — the finest chromium alloy ball-bearing type. They're made with special tools in a special factory—only one of its kind in the world. Each pump is pre-set and given a 6-hour run-in. Single orifice design of valve cuts down possibility of fouling. In short, with Caterpillar parts you're sure of better performance, less down time.

With substitute parts, can you be sure of anything?

Better get Caterpillar original parts every time.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



With clean fuel, CAT* fuel injection valves and pumps can last 20,000 hours and more. They are 100% interchangeable among cylinders of same engine or like models.

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